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TRANSACTIONS

OF THE

MEDICAL AND PHYSICAL SOCIETY

OF

BOMBAY.

FOR THE YEARS M.DCCC.XLV AND XLVI.

BOMBAY:

PRINTED AT THE AMERICAN MISSION PRESS,

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1847.

No. VIII.

MEDICAL AND PHYSICAL SOCIETY
OF
BOMBAY.

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Ex-Officio.

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AND DEPUTY INSPECTOR GENERAL OF HOSPITALS.

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TRANSACTIONS.

1845 & 1846.

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OF THE
MEDICAL AND PHYSICAL SOCIETY
OF
B O M B A Y .

1845 & 1846.

ARTICLE 1.

Remarks on the Enlistment of Recruits and the System of Invaliding pursued in the Native Regiments of the Bombay Army. By F. S. ARNOTT, M. D.

Presented January, 1846.

1. My experience as a member of a General Invaliding Committee, for eight or nine seasons, has convinced me that the system of invaliding in the Bombay Army is open to many abuses, and that it is often carried out in an extremely lax and irregular manner. To this my attention was first forcibly called, by the extraordinary disparity prevailing in the numbers of men sent up by different Regiments, and the very large proportion of comparatively young men annually pronounced unfit for active service; and, on devoting my leisure time to a thorough investigation of the subject, I found that the number, which annually becomes non-effective in the Bombay Army, equals, or nearly so, that of the Bengal Army, though the latter consists of 72, and the former of only 26 Regiments. Suspecting that the enlistment of improper recruits, conjointly with the faulty system of invaliding, might be the cause of what I had

observed, I was induced, with the view of obtaining data for judging how far our system of invaliding was calculated to do justice to the old and faithful soldier, and at the same time to prevent the state being burthened with an unnecessarily large pension establishment, to examine the official returns of invalids for a series of years. I intended the examination to extend to twelve, and began with the returns of 1833, but the delay in publishing and difficulty of procuring those of 1844, made me confine it to eleven. This I somewhat regret, as the even number would have had the advantage of being for a longer period, besides being divisible into two equal terms, one of the reduced, and the other of the augmented strength of the army.—By adopting the shorter period, the calculations have become a little more intricate, but still they will afford grounds sufficient for the few remarks I purpose making.

2. The returns of the unfits of the Bombay Army from 1833 to 1843 inclusive, show that in the eleven years, 8,812 Native Officers, Non-Commissioned Officers and Privates, not including 46 pensioned for wounds, became non-effective out of the 26 Regiments of Native Infantry of which it consists, 6,672 deemed entirely unfit for further service, being discharged with pensions or gratuities, and the remainder, or 2,140 transferred to the Native Veteran Battalion for garrison duty.

3. During the first six years, viz. from 1833 to 1838 inclusive, the full native strength of each Regiment was 774 of all ranks, giving for the whole of the 26 Regiments an aggregate of 19,344. In that time 4,834, or $805\frac{2}{3}$ annually, became non-effective, which is at the rate of $41\frac{2}{3}$ per thousand per annum, and equivalent to the entire absorption of the army by invaliding alone, every 24 years.

4. During this period peace reigned throughout India, and, there being no prospect of war, the strength of the army underwent no change, at least, none to affect the returns on which the calculations are founded, as the recruiting for the augmentation ordered in 1838 was scarcely begun at the season of invaliding of that year.

5. For the five years commencing with 1839 and ending with 1843, less accuracy for obvious reasons can be arrived at than during the preceding term : still sufficient has been obtained to prevent errors of any magnitude in the calculations. During this time we were engaged in important foreign wars, and the army was increased to the extent of more than one-third, or from 19,344 to 30,166 men in the Regiments of the line, but the augmentation was gradual and the strength fluctuating so that it is not easy to get the average. It most likely, however, did not exceed 27,144 of all denominations, and a large portion consisted

of men recently admitted into the service and ineligible either for pensions or the invalid establishment. Nevertheless the unfits, exclusive of 46 pensioned on account of wounds, numbered 3,978, or $29\frac{1}{4}$ per 1,000 per annum of the whole strength.

6. During the eleven years, commencing with 1833 and terminating with 1843, the average strength of the army may be stated at 22,890 ; and the unfits during that period amounted to an average of 801 annually, or a total of 8,812, being at the rate of 33 per thousand per annum.

7. The average strength of each Regiment for the eleven years may be considered to have been about 880 men, and the unfits upwards of 30 annually ; but while some Regiments had as many as 462 in the eleven years, or $52\frac{1}{2}$ per cent. of the whole strength, others had only 203, or little more than 23 per cent. A disproportion equally remarkable appears to exist in regard to the periods at which pensions are granted in different Regiments. In some we find that only 1, 2, 3 or 5 men, have been discharged on the full or 30 years' pension, in the eleven years ; whilst in others 33, 43 or 46, have received full pensions. In some, on the other hand, only 36, 47 or 48, have been discharged on the half or fifteen years' pension ; and in others as many as 133, 135 or even 260. In one corps, out of 405 men invalided, in eleven years, only one was entitled to the full, whilst 260, or 64 per cent., received the half pension. In another, which invalided 323, and in which we find the highest number pensioned on full pay, the extremes of full and half pensions are more nearly balanced ; as 46, or $14\frac{1}{5}$ per cent., received the full, and 48 or less than $14\frac{1}{5}$ per cent., the half pension.

8. The rates of pension and periods of service of the Native Officers who were invalided during the eleven years, are as follows. Total pensioned 398. Of these 236 or $59\frac{1}{2}$ per cent. having served the full term of 30 years, received full pay, 27 or $6\frac{3}{4}$ per cent., having served from 28 to 30, were pensioned on six-sevenths, 66 or $16\frac{1}{2}$ per cent., having served from 25 to 28, on three-fourths, 59 or $14\frac{5}{7}$ per cent., having served only two-thirds of the required time, or from 20 to 25 years, on two-thirds and 10 or $2\frac{1}{2}$ per cent., were entitled to half pay or the fifteen years' pension.

9. I have not been able to determine the average service of the Native Officers who have been pensioned on full pay ; but assuming it to be 34 years, and my experience would not rate it higher, the average of all periods of the whole body may be stated at 30 years : and entering the service at 18, their average age on retiring on their pensions may be taken at 48 years.

10. I am not furnished with any data to enable me to estimate the average period of active service of the 2,140 Native Officers, Non-Commissioned Officers, and Privates who were transferred to the Native Veteran Battalion for garrison duty ; nor have I ascertained their average period of service in that Battalion ; so far therefore the calculations entered into are incomplete.

11. The distribution of the remainder, amounting to 6,274 Non-Commissioned rank and file discharged with pensions and gratuities in the eleven years, is striking on account of the proof it affords that the number of men who serve till they are entitled to the higher rates of pension is very small, and that an extraordinary number of very young soldiers are annually discharged. 1,307, or $20\frac{1}{5}$ per cent., were discharged with gratuities after periods of service, varying from about 1 to 14 years, 2,549, or upwards of 40 per cent., were entitled to the lowest scale of pension for a service of between 15 and 20 years, the two classes taken together constituting about 61 per cent. of the entire number.

12. Taking the average service of those discharged with gratuity at $7\frac{1}{2}$ years, and of those with half pension at $17\frac{1}{2}$, it follows that sixty-one per cent. or three-fifths of the whole of the men who have been discharged with a pecuniary reward for their service to the state, completed an average period of service of only 14 years and one month, retiring at the average age of 32 years and one month.

13. Of the next grade, or those who served from 20 to 25 years, there were 1,327, or $21\frac{1}{2}$ per cent. 473, or about $7\frac{1}{2}$ per cent., served from 25 to 28 and were entitled to three-fourths of their pay : 193, or about 3 per cent., from 28 to 30 and were entitled to six-sevenths : and 424, or less than 7 per cent., of the whole, having served the full period of 30 years, established a claim to full pay.

14. If then we count the service of those who completed the full period, or with the Native Officers, at 34 years, which is certainly not too little, and the others at the middle of the terms in which they were respectively pensioned, the average of the 39 per cent. above 20 years' service amounts to 25 years and ten months, and the age on retirement to between 43 and 44 years.

15. On an average of the whole, the service of the Bombay sepoy may be reckoned at 18 years and eight months, and his age on retirement at 36 or 37 years.

16. The comparative length of service of the two classes of Native Commissioned Officers, and Non-Commissioned rank and file, will be best seen by being placed in juxtaposition as follows :—

Rank.	Under 20 Years' Service	From 20 to 25 Years' Service	From 25 to 28 Years' Service	From 28 to 30 Years' Service	Above 30 Years' Service
Native Officers.	2½ per cent.	14⅙ per cent.	10½ per cent.	6¾ per cent.	59½ per cent.
Non-Commis- sioned Officers Rank and File. }	61 per cent.	21½ per cent.	7½ per cent.	3 per cent.	7 per cent.

17. As it appears then, that of the whole number of men discharged with pensions and gratuities (for I have not taken into calculation a few discharged without either), 20 per cent. scarcely average $7\frac{1}{2}$ years service, and 40 per cent. only $17\frac{1}{2}$; or taken together, three-fifths of the whole complete little more than 14 years, it becomes a matter of serious consideration whether the men admitted into the service are of a description calculated to ensure the efficiency of the army,—whether they are exposed during their Military career to causes unavoidably destroying their constitutions at the early age of 32 and 36 years,—and whether the invaliding of them is as carefully and judiciously conducted as circumstances will admit of. On each of these three points I will now venture to offer such remarks as have suggested themselves to me.

18. The strength of the Bombay Army, as of the British Army, is maintained by volunteers who offer themselves at head quarters of Regiments, or who enlist with parties detached into the provinces. At Regimental Head Quarters the recruits are submitted by the Adjutant to the Commanding Officer, and then, if approved of by him, to the Medical Officer. The men engaged by recruiting parties are generally submitted to examination at the first station they reach, before a committee consisting of two Military Officers and one Medical Officer, or possibly to a Medical Officer only. So far does enlisting in this Presidency coincide with that of the British Army, on which, as far as practicable, the Indian Army is strictly modelled. Still it seems but too probable that the details of the system are not carried out with as strict attention to the efficiency and various qualities which are required in a recruit, as in the Royal Service.

19. In the British Service, the recruits approved of at Regimental Head Quarters are subjected to no further examination, but those enlisted elsewhere are examined “at the place where they engage by a person of the medical profession,” then by the District Staff Surgeon, and subsequently by the Surgeon of their Regiment, thus undergoing three medical examinations, before they are finally approved of; and no recruit is finally approved of until he has been examined, and reported eligible by the Medical Officer in charge of the Regiment or the depot of the corps in which

he has enlisted. The decision of the medical practitioner who first examines the recruits, that of the Staff Surgeon who intermedially examines them, and that of the Regimental Surgeon who finally examines them, are all therefore conclusive in as far as regards those rejected; but the final approval rests with the Regimental Surgeon, though this sometimes leads to the anomaly of a very young Medical Officer disapproving of the decision of his superior the Staff Surgeon.

20. The instruction laid down for the guidance of Medical Officers in the circulars of the Army Medical Department, dated August 24th, 1821, and June 1st 1824, upon the subject of the examination of recruits, are most minute and comprehensive. These and the following short extracts from official documents evince the importance attached to recruiting in the Royal Army; the nature of the duties devolving on Medical Officers; the responsibility they incur in the performance of these duties; and the qualities considered essential in a soldier.

21. In a circular dated Horse Guards, 24 August, 1815, it is strictly enjoined, that no man "should be received who is not perfectly eligible for the service," that, "men with respect to the soundness of whose health or constitution there is any doubt should not be enlisted;" as it is not to be expected that men of this description "can be equal to the fatigue and exertion inseparable from a soldier's life." The circular 27th August, 1821, again urges, that every precaution should be taken that "no recruit be received that shall not in point of general health, shape, and appearance, afford the surest promise of becoming an active, robust, and well looking soldier." The General Order, dated 1st October, 1823, states, that "His Royal Highness will not fail to notice in the strongest and most effectual manner any inattention or disregard to the instructions regarding the examination of recruits with respect to shape, activity, and stamina;" and the circular of 14th August, 1824, calls attention particularly to points connected with "the constitutional appearance, mould of chest, size of bone, and likelihood of growth, of the recruit."

22. The duty of inspecting recruits, and of "determining whether they are fit or unfit for the Military service of the country, is one of the most difficult and responsible an army Surgeon has to perform. To enable him to execute it correctly and with suitable promptitude, he would require more knowledge and experience than is generally believed; he must possess an intimate acquaintance with anatomy, physiology, and pathology. A knowledge of these sciences is essentially required to qualify him to decide upon the health and general efficiency of recruits, and to distinguish between defects that may be real, from those that are only

feigned." "He must also be well acquainted with the duties of the different classes of soldiers, Infantry, Artillery and Cavalry, during war as well as in peace. The qualifications for performing so important a duty can be acquired only by long servitude and much experience."

23. The Bombay Military Code is singularly barren, or rather, is utterly destitute of instructions for the guidance of Medical Officers as to the duties required of them in the matter of recruiting; and though the Medical Regulations do contain two paragraphs of detailed instructions relative thereto, it is feared the subject does not meet with that attention its importance deserves. In selecting recruits for the Native Army, their capability for service in many instances depends almost entirely on their being of the prescribed height and pronounced by the medical officer free from bodily ailment. A man however may be of the regulated height and perfectly free from bodily infirmity, and yet be quite unequal to the fatigue, privations, and hardships, incident to a soldier's life. Indeed where the selection of recruits is from such diminutive races as those of the Deccan or Concan, or from the mere refuse of the more athletic races of Hindoostan, as is the case with the Bombay Army, far too much importance is attached to their height. This can be easily explained by the desire of Commanding Officers for the fine appearance of their corps; but were more attention bestowed on their weight, it is very probable a more serviceable sort of recruits might be enlisted.—A long, lank, narrow chested, spare limbed man, however well he may be made by padding to look on a parade, can never turn out a hardy and efficient soldier: and, in nine cases out of ten, the man of five feet eleven, would never do half the work of a man of five feet seven of the same weight. A soldier should possess such soundness and vigor of constitution as will enable him to endure great changes of temperature, and great vicissitudes of weather, to undergo much fatigue in marching, to brave the greatest dangers, and often to sustain considerable privations of the common necessities of life. It is not presumed that men of such a perfect constitution are always procurable, but the nearer the recruit approaches to such a standard the more useful soldier will he prove, for it is clear that such a man will resist disease and endure hardship, when one of a more delicate frame would succumb, and either be lost to the state by a premature death, or become a burthen upon it, by an early transfer to the Invalid Establishment or pension list.

24. The practice in our service in regard to the recruits enlisted at Regimented Head Quarters, is the same as in the Royal Army, and the decision of the Regimental Medical Officer as to their eligibility or ineli-

gibility is conclusive. In regard however to those enlisted by parties detached from Regimental Head Quarters, and they may, generally speaking, be considered about nine-tenths of the whole, it is widely different; and the decision of a committee, directed to assemble for their inspection and composed of experienced Officers, with at least one Medical Officer, is final and conclusive as to their fitness or unfitness, it being contrary to established usage to subject them to further examination. It thus appears that the decision as to eligibility or ineligibility rests with the first Medical Officer chance may throw in the way. In Her Majesty's service the District Staff Surgeon is invariably an officer of at least 20 or 25 years experience, and with him the examination of recruits is a daily occupation. In the Company's service the Medical Member of the Committee is appointed without reference to his practical knowledge of the average stamina of the Native Army, or of the standard of size, strength, &c. it can be kept up to by recruiting among the different races of the people of India.

25. The medical examination of a recruit ought to comprehend every thing connected with his general health, strength or feebleness of constitution, previous disease, muscular capability, the configuration of the spine, thorax, and pelvis, the condition of the superior and inferior extremities as regards fractures, contusions, nodes and varicose veins, the state of the ears, eyes, mouth, and mental faculties, &c. &c. together with his height and age. If the committee be expected to decide on these points, they are obviously called on to perform a duty for which the majority are incompetent. The Military Members though unable to form any opinion of the actual presence of, or predisposition to disease, by a strange incongruity, have the power by their numerical superiority, to overrule and set aside the decision of the Medical Member, whilst in the event of difficulty or doubt in his mind, they can lend no assistance whatever. Their presence indeed is more likely to embarrass than assist him, and by a division of responsibility to give a tendency to hurried and careless inspection. Most assuredly it would be far more judicious for Staff or Commanding Officers to limit their enquiries to the height, age as far as discoverable, and general eligibility of the recruits, and to leave the decision of their fitness or unfitness in other respects to those capable of judging between a sound and unsound constitution, of the absence or presence of disease, and of those other qualities indispensable in a soldier.

26. The dispensing with any further examination and the opinion of the Medical Officer in charge of the corps to which the recruits belong, removes a very important check upon the careless admission of unfit

persons into the service. The committee have little interest in passing or rejecting them, and it is only too probable that the Military Members often satisfy themselves with recording their age and height, and the Medical Member with assuring himself of the absence of actual disease or deformity. With such divided responsibility, particularly where the number to be examined is large, and it is no unusual thing for upwards of 100 to be brought up in one day, less care and attention are to be expected than from the Surgeon of the Regiment, by whom defects would often be detected that escaped attention at the hurried and superficial examination of the Committee.

27. Every young and inexperienced Medical Officer, who may accidentally be first on the roster for line duty on the arrival of recruits at the station, cannot be a good judge of their fitness or unfitness; nor is seniority always a guarantee for superior tact and judgment, but it is only fair to presume that, a man well acquainted with the native constitution, character and language, as well as the duties and exertions required of soldiers, is more likely to discover disqualifications than one of short standing in the service. Were more importance attached and more attention paid to this duty than is the case at present, and were Superintending Surgeons in their annual tour to inspect all recruits of the season, I am confident that the instances we see every year of men of 16 and 17 years' service being placed on the pension establishment, before they reach even what is generally considered the prime of life, would soon be less numerous. All the expense and trouble too of training would not be thrown away on men unequal to the duties of soldiers, and unable to complete more than six or eight years' service.

28. It is impossible here to enter at any length into a consideration of the effects which exposure to endemic and epidemic influence has on the early invaliding of so large a proportion of the Bombay Army. Many districts are proverbially insalubrious, and not a doubt can exist that the health of many a valuable soldier, in late years, was ruined in Cockermonda, Dhyal, &c. and there probably never was a more prudent and economical measure than that of withdrawing the regular troops from these and other pestilential outposts in Candeish and Guzerat. The fever and spleen disease contracted in these unhealthy spots, heavily burthened the pension list, and the evil was aggravated by advantage being not unfrequently taken to found a claim for pension on the mere circumstance of having served in the districts, when no disease whatever had been contracted. To whatever extent it may have operated however, this cause alone will not account for the disproportion formerly adverted

to, because some of the Regiments, whose unfits number highest, have not of late years served in Candeish, some have not been in Guzerat, and some which have served in both have the smallest number of unfits.

29. The duties of the Army during the first six years, embraced in these returns, and for many previous years, were not severe. From the long continuance of peace the services of no man were required beyond the limits of the Presidency, and few had ever seen a gun fired. Beyond the unaccountable practice, therefore of commencing the annual drill and continuing it during the season notoriously the most unhealthy, nothing extraordinary occurred to influence the health of the troops.

30. In the subsequent five years their duties were more severe, and many lost their health in the insalubrious regions, the late arduous campaigns added to the British empire. Here again, however, we find that the Regiments which have seen least active service, or have not been on foreign service at all, have by far the heaviest returns of unfits. In short it is difficult to assign any valid reason for such inconsistencies, or even practically to prove that the Bombay sepoy, in particular, is subjected to influences calculated to injure his health or impair his efficiency at an unusually early period.

31. Without entering upon the question of the average period of service expected of sepoys, in reference to which the Invaliding and Pensioning Regulations were framed, it will be sufficient for the few remarks I intend to offer, to refer to the data furnished in Para. 7, relative to the difference in the periods of service of men in different Regiments, to Para. 9, and 15, for the average service of the Native Commissioned Officers and those who do not attain that rank, and to the very extraordinary contrast exhibited in Para. 16, between the two classes.

32. By Para. 7, it appears that some Regiments invalidated upwards of a hundred per cent. more than others, and that, of 405 men from one, only a single individual was found to be entitled to the full or 30 years pension; whilst 64 per cent. of the whole were discharged on the half or fifteen years' pension. In another corps again, the full and half pensions were nearly equal, being 46 and 48, or about $14\frac{1}{2}$ and $14\frac{7}{8}$ per cent. These extraordinary discrepancies are perfectly inexplicable, either on the grounds of greater exposure to disease, or severer hardships on active service, and can only therefore be attributed, as far as I can judge, either to the enlistment of improper recruits, or to the partial working of an ill understood and ill regulated plan of invaliding and pensioning.

33. The contrast between the periods of service, of the Native Officers, and of those who do not attain that rank, is also not a little

remarkable. The former, as appears by Para. 9, complete an average of 30 years, whereas the latter, as seen in Para. 15, serve only 18 and 8 months. Para. 8 and 12, shew that only $2\frac{1}{2}$ per cent. of Native Officers are invalided at about $17\frac{1}{2}$ years, whilst 61 per cent. of the Non-Commissioned rank, and file are discharged at 14. On the other hand $59\frac{1}{3}$ per cent. of the former serve 30 years and upwards, whilst only 7 per cent. of the latter complete a like period, the proportions for the full and half pensions being thus nearly reversed in regard to the two classes.

34. It would be tedious to enter into an examination of the various causes that might be adduced to account for the differences shown in the last paragraph; but as the Native Officers necessarily rise from the ranks, are precisely the same class as the men, are probably never selected on account of mere physical stamina, and as there are no complaints of their general efficiency as a body, it may fairly be argued that they are not unequal to the performance of their duty for an average period of 30 years. The Non-Commissioned rank and file serve very little more than three-fifths of that time, or 18 years and 8 months; and to explain such a difference some clear and satisfactory reasons in regard to the nature of their several duties, &c. ought to exist. If no such reasons can be urged, we must seek for an explanation elsewhere, and I believe we may find it in the invaliding and pensioning regulations.

35. The Native Commissioned Officers on being relieved from the drudgery of the lower grades find themselves in very easy pecuniary circumstances, with light duty, commanding a degree of respect always flattering to human nature, and certain of further promotion, higher pay, and higher pension by remaining in the service. Not unfrequently too their Regiment becomes their home by the marriage of their daughters and the enlistment of their sons into it. They are therefore, generally speaking, contented with their lot, seldom very solicitous for their pensions till they complete their full period of service, and, if their constitutional or mental vigor is not very materially impaired, they have no difficulty in accomplishing their wishes.

36. It is different with the lower grades. The severer nature of their duties, and their greater liability to fatigue and exposure, together with the deprivation of the comforts of life, and a diet perhaps less wholesome, must, *cæteris paribus*, prove more injurious to their health and efficiency, but at the same time I think it may fairly be doubted if the difference of duties and comforts, &c. are sufficient to explain the difference in the length of service of the two grades.

37. In the catalogue of reasons, however, I think disappointment

and disgust may be admitted to operate to an amount fully equal to the above. No sooner does a man experience the mortification of witnessing the preferment of his comrades, than he begins to draw comparisons unfavorable to himself, and to contrast their better luck with what he considers his own misfortunes; he despairs of promotion, and finds himself superceded by men inferior to himself in birth and caste, to whom he must pay obedience and respect; his duties become no lighter; he has no chance of better pay, and his claim to higher pension advances slowly; at length the service becomes irksome to him, and he looks forward to the time when he may be able to retire from it to the enjoyment of his case with his own family. At first the wish may only occupy his mind occasionally, but gradually it gathers force, and he entertains and matures plans for effecting his discharge. As the periods entitling him to pension arrive, his longings for home increase, and he seeks for an excuse to get into hospital. He is admitted, gets well, and is discharged. After a short time the same thing is repeated, but on this occasion he remains in the sick report for a longer time. In the mean while he manages to reduce himself from his usual healthy aspect, which has considerable effect among his companions, and he is encouraged thereby to persevere. Next time he shows himself at hospital, he has made a firm determination to make the most of his complaints; he now submits cheerfully to medical treatment, and will often with the most persevering endurance undergo a system of demi-starvation that few Europeans would stand. By these means he becomes sufficiently emaciated and sickly in appearance to warrant his giving in his name to appear before the invaliding committee, to which as he has *prima facie* a strong case from being so much in hospital; the Officers of his Regiment offer no objections, and according to our mode of pensioning, he seldom finds many obstacles in the way of obtaining his discharge.

38. This is the class of cases which swells our invaliding returns. There is no disease, at least, none that is serious, but a dogged determination on the part of the patient to effect his discharge, and in some Regiments the manœuvre is more successfully carried on than in others. An attentive consideration of the subject has convinced me, that the extraordinary number of young men annually removed from the effective strength of the Army, viz. 61 per cent, at little more than 14 years' service,—the disproportion between the numbers of men invalided by different Regiments, viz. 462 and 203 as per Para. 7,—and the early invaliding of the Bombay sepoy as contrasted with the Native Officer, may be mainly attributed to our defective system of invaliding, the facilities it affords to

men like the above for accomplishing their removal from the active strength, and to what a Correspondent of the "*Bombay Times*" in March 1844 termed the "vague, indefinite and unintelligible, nature of the orders regarding unfits."

39. I will however describe the system, and attempt to point out what to me appear to be the defects of it. According to the present practice, unfits are, in the first instance, selected by Officers in charge of Companies, or by the Medical Officer of the Regiment, though the regulations of Government only direct that the latter is to furnish lists of men proposed to be invalided. They are then submitted to examination before a Regimental committee composed of the Commanding Officer, Adjutant and Medical Officer. At this committee, those who are deemed fit objects to be transferred to the invalid, or pension establishment, are afterwards sent before the Annual General Invaliding Committee, composed of three experienced Military, and two Medical Officers, which is assembled at Division or District-Head Quarters. If any are too sick to proceed thither, they are permitted to be passed by committees, at the stations where their Regiments are serving. The Officer Commanding the Division, Brigade, or Station, is afterwards expected to inspect the men who pass the committee; rolls are forwarded to Army Head Quarters, and returns to the Medical Board, for the final disposal of the cases. It was also thought expedient, with a view to prevent the abuses, to which the pension establishment is liable, to assemble a triennial committee, empowered to return to their Regiments, all men capable of general service, but this triennial inspection was lately ordered to be discontinued.

40. The constitution of the Regimental Committee probably could not be improved, for the individuals composing it, from their acquaintance with the health and claims of the men, must be best qualified to institute the preliminary inquiry which their proceedings are supposed to be.—In favour of the General Committee, (the tribunal before which the men have next to appear) much less can be said. District-Head-Quarter Stations, seldom having more than two Regiments, it is necessarily formed of their two Commanding, and two Medical Officers, with probably the Brigadier as president, or a fifth member from one of them. Thus it uniformly happens, that at least, two members have already pronounced an opinion on every man of their respective corps who is to appear before it, and the proceedings are neither more nor less, in most instances, than a confirmation of the Regimental ones. To a fair and impartial inquiry this constitution is necessarily fatal, as the knowledge to be acquired, from a

cursory examination in the Committee room, is considerably supposed to be inferior to what the Officers of the corps, to which the men belong, already possess. In their opinion therefore the other members quietly acquiesce, naturally expecting the same delicacy to be shown to them when their men are called up. The deference to the power of Commanding Officers gives them an undue influence with the Officers of their own Regiments, whether Military or Medical, in regard to their own men. In some cases likewise, the decision seems even to depend on mere caprice, for the writer in the "*Times*" already referred to, alludes to instances where men were rejected merely because the Officers of one corps were considered over-scrupulous in the examination and passing of men belonging to the other. The facilities are evident which this system affords to Commanding Officers to get rid of men they may be prejudiced against or dislike, though they may be perfectly fit for duty, and the "*Times*" Correspondent, accordingly, asks, "is not every man, who is considered awkward, or ugly, who may be thought a little troublesome, discontented, or unable to fit his belts, dragged before the Invaliding Committee, however healthy, and robust he may be," affirming at the same time that the "pension and invalid establishments have become receptacles for every man who may fail in any one way to give satisfaction to his Commanding Officer."

41. Were the Committee expected merely to enquire into the periods of service, and determine the rates of remuneration to which the men brought before it are entitled, little fault perhaps could be found with it, for where the regulations are so clearly laid down as to the rates of pension, &c. for the various periods of service, as they are in our Military Code, it can signify little how it is composed, because the returns provided by Regiments, furnish the data by which it is regulated, and from them, under ordinary circumstances, it cannot depart.

42. But on the other hand, if an invalid means a man incapable of performing the active duties of a soldier on account of disease, debility, or old age; and if the Committee is expected to enquire into his state of health, ability, or inability to serve the State, the nature, extent, and even the existence of his disease, then we have the extraordinary anomaly of a court so constituted, that three-fifths of its members are required to enter upon an investigation of the nature of which they can know nothing, with the power, if it so pleases them, to set at defiance the opinions and votes of those members who only can have a competent knowledge of the subject.

43. The truth is, however, the Committee has two separate and distinct duties to perform: the one to enquire into, and decide on the nature

and extent of disease, or of its existence, or non-existence; and the other to determine the claims of individuals where disability does exist. This amalgamation of incongruous duties is only equalled by the anomalous position in which the parties composing it find themselves placed; the majority comprehending nothing of disease or the medical "reason why unfit," on which the whole proceedings ought to be based, become impatient, and not unfrequently cut short every attempt at inquiry into the causes of disability, resigning themselves to the most apathetic indifference as to its nature or even its existence. They naturally attach the greatest weight to, and are most anxious about the correct entering of the decision, the scale of pension, &c. the only part of the duty they understand, and for which they consider themselves responsible. In this way a medical examination becomes of very secondary importance, and a searching one is never expected; indeed it is not always deemed necessary first to ascertain whether the man is fit or unfit, it not unfrequently happening that the only question thought of is "where" he will draw his pension.

44. The medical members feeling their responsibility, may be anxious to pay every regard to the claims of individuals, and at the same time to devote the requisite degree of attention to the protection of the public interests, conscious that they alone are competent to detect imposition; but if they have had any experience of the manner, in which the duties are conducted in these Committees, they must know that their opinions, even on professional points, are liable to be overruled, and their decision as to fitness, or unfitness, is one of minor consideration. Whether or not the junior members, they form an uninfluential minority, and keenly sensible of this, rather than vainly oppose the majority, and perhaps the wishes of their own Commanding Officers, they tacitly submit to see, year after year, the pension list onerously burthened by men quite unworthy of its advantages. A man, declared by the Surgeon of his corps to be a malingerer, on his way to appear before the general invaliding Committee at Division Head Quarters, fell from his pony, and broke his collar bone;—on his appearance before it, the Medical Officer then attending him, certified that he was recovering from the accident very favorably, and that he was not aware of the existence of any other disease. His appearance was that of a robust man, of about 34 years of age; the Superintending Surgeon of the Division and an Assistant Surgeon, (the medical members of the Committee,) could discover no ailment to warrant his being discharged from his corps: they were overruled however, and he got a pension though he ought to have had a Court Martial.

45. Such is the usual mode of procedure, and strange to say, there

are cases which avowedly require no medical opinion whatever, and these are styled "not hospital cases." No doubt many men are brought forward who have not been in hospital during the year; but there must be some reason for their appearing, and whether that be old age, debility, or actual disease, it must be considered a medical one, and medical men must be the best judges of it. If the soldiers of our Army could claim their discharge and pension, whether disabled for further service or not, there would be no necessity for appointing Medical Officers members of the Committee. Such however, is not the case, and there ought to be a medical reason assigned for the bringing up of every man as an invalid. If no physical disability can be certified, he cannot be an invalid at all, and ought to be returned to his duty. The power of deciding in certain cases, without reference to medical opinions, gives the non-medical members an opening for interfering in all, and should a difference of opinion between them and the medical members arise, they can summarily settle it by first voting the case to be "not a hospital case," with which they fancy medical members have nothing to do.

46. With certain complaints most people imagine they are to a greater or less extent acquainted; nevertheless, it may be very fairly doubted, if any non-medical man, can in any instance, aid the medical members in distinguishing between temporary and permanent, or between genuine and feigned disabilities. It requires no argument to prove that the nature and extent of disability, if such is required to be known, will be more certainly discovered by those who have the accurate knowledge that is to be obtained from clinical observation, and pathological writings of authority, than by those possessing natural sagacity in the highest degree, if unassisted by a habit of carefully contemplating and studying disease. "Worn out," "Debility," and "Rheumatism," are the most common reasons for discharge, and almost every person considers himself qualified to give an opinion on such cases; but in regard to Rheumatism, the most common of these, even medical authorities encounter great difficulties. Marshall says rheumatic complaints may probably be considered the class of ailments most frequently assumed by old soldiers to obtain their discharge; they commonly think nothing more is required to render their defect plausible than to affirm that they have pain in some part of the body, assume the aspect of suffering, and affect decrepitude or loss of power in the limbs or joints. They seem to consider the constant use of a crutch, or stick, and a ready submission to such remedies as blisters, cupping, setons, &c., as irresistible proof of the reality of their disease. They appear before the Committee the very picture of misery:

they are slovenly dressed, unshaved, haggard in appearance, and bent double, and from their pity they are often granted a pension. A medical examination, however, would probably detect under this imposing exterior that the subject was youthful, his health good, and the seat of the alleged pain was unaffected by swelling, redness, or increased temperature; under which circumstances, he adds, "a Medical Officer will probably in nineteen out of twenty cases be safe in concluding that no material disease exists." Beck, warns medical men, in cases where no sensible appearances prove the existence of Rheumatism, not to mistake a feigned for a real disease, and with respect to pains and Rheumatism which are not proved, that it is better to prefer severity to indulgence, as military exercise far from aggravating the predisposition, if it exists, will only contribute to remove it. The circular of the Army Medical Department of 22nd January 1830, states that "these affections are a fertile source of fraud, and as long as men are discharged in consequence of Rheumatism, instances of imposition will frequently occur." Hennen, again says in reference to Chronic Rheumatism, "if there is not evident wasting of the limb said to be affected, I should not conceive it to be a sufficient cause for excusing from duty, or invaliding any class of military men;" and Marshall, in reference to real, and simulated Rheumatism says, "the most eminent and attentive Medical Officers have been deceived in their diagnoses." That this disease is extensively feigned I am fully convinced, for I cannot otherwise account for the remarkable circumstance of perhaps 20, 30, 40, or more men, apparently martyrs to Lumbago, being sent up by a single corps before the Committee, while another Regiment at the same station, and of course performing the same duties, may have scarcely had a case, and while the proportion of men invalided for Rheumatism in Bengal, seems to be between 2 and 3 annually per Regiment.

47. One of the most eminent Physicians of the present day, who has not hesitated to declare that, to distinguish between sterling and counterfeit disease, is one of the most difficult duties he has to perform, states, that malingering in some corps, has become an intolerable nuisance, and that it requires the most assiduous attention on the part of the Medical Department to put it down. If then, as has been asserted elsewhere, it prevails to an enormous extent in the Bombay Army, it may well be asked if it is likely to be checked, when the Surgeon gets clear of all responsibility by filling up the column assigned to him with such vague and evasive remarks as "no medical opinion," "not in hospital," "no medical treatment," &c. Any of these is considered sufficiently explanatory and may be often very convenient to him; for, though the withholding of his opinion

occasions no difficulty whatever to the Committee, most Medical Officers have probably found themselves at one time or another in the very unenviable situation of being "importuned for medical reasons and being expected at the expiration of a certain time to assign causes of discharge whether they existed or not."

48. Correct returns of unfits, and their pensions, &c. are absolutely indispensable, and every precaution should be taken to ensure the due performance of the duty; but the preliminary investigation, as to ability or disability for further service, should not yield in importance to it, which, it may be assumed it does, from the majority of the Committee being appointed to the fixing of the rate of pension. A fair and impartial medical examination, if not quietly dispensed with, is thus endangered or rendered impracticable. It has been asserted in reference to H. M. service "that the invaliding and pensioning of soldiers is conducted ignorantly, unjustly, and extravagantly:" that the assertion might be applied justly to our service under the present system, is undeniable. The correspondent of the "*Times*," says, "men perfectly free from bodily ailment, and fit for any kind of duty, are year after year sent to the Invalids merely because there is no adequate enquiry into their cases. In the first place the Committee is incapable of such an investigation, and in the next the members are too often directly, or indirectly interested in passing the men."

49. Between the assembling of the Regiment and General Committee, a month generally intervenes, during which time, Adjutants and Medical Officers of corps prepare their respective returns, the former for the decision, &c. of the General Invaliding Committee and Government, and the latter for the information of the Superintending Surgeon and Medical Board. In the former, the Medical Officer inserts a short opinion as to the cause and extent of unfitness, as unfit from blindness, deafness, asthma, rheumatism, &c. or "no medical reason." In the latter, he enters more into detail, giving a short history of each case, and summary of the treatment, &c. This return it is not necessary to produce, and as the one furnished by the Adjutant does not necessarily contain any detailed information regarding the extent, nature, or duration of the disability, the Committee have no easy task in their intricate investigation. Without data to guide, or assist them, their decision is not unfrequently made in utter ignorance of the merits of the case, and they are obliged to take for granted, that the men are unfit, as stated in the return. If as often happens, from 100 to 200, or 300 cases are disposed of in one day, can it be wondered at that this important duty, is carelessly conducted, and that ill considered and extravagant pensions result therefrom?

50. In convoking the Committee, it is not necessary to hold any communication with the Superintending Surgeon, and in most instances, he is not previously informed who the medical members are to be. The duty is considered a matter of simple routine where his advice is not required, and when at the station, he is himself directed to be a member. He may send back the returns of Medical Officers, and require explanations, &c., but with the proceedings of the Committee, he has no more power to interfere, than any other member, though his official rank is generally superior to that of the President.

51. The various checks already mentioned, I fear in practice prove of less value than might be expected. The Brigadier being very often a member of the Committee, can scarcely be expected to reject men he has already assisted to pass, and it seldom happens that he interferes unless some particular case be strongly pressed on his notice. The Commander-in-Chief and Medical Board, it is true, are expected to correct the errors of the Committee, but distance and many other reasons prevent their taking a very active or prominent part in the matter. Besides, the prevention is far better than the correction of error; and were Committees, entirely Medical, unconstrained and unembarrassed by the presence of influential and interested military members, required in the first instance to decide on the men that are unfit for further service, from corporeal, or mental disability; the duties of assigning pensions, and deciding on the cases of men, whose removal from the effective strength becomes expedient, for reasons in no way connected with health or strength, left to future Military Committees; were the primary Medical Committees furnished with the detailed statements sent in by Regimental Medical Officers; were Superintending Surgeons empowered to exert a proper control over the proceedings, which they could legitimately do in regard to Medical Committees; and in all cases, where practicable, were they required to inspect all unfits before they are finally disposed of, I think it very probable, that in a very short time, less than 61 per cent. would be found to serve only fourteen years, and less than 40 per cent. to complete only the period entitling to half-pension.

52. I am no advocate for exhausting the entire physical powers of soldiers before granting their discharge, nor for encumbering the ranks with sickly, enfeebled, old, or worn out men; but if we find in the Bombay Army, that 61 per cent. of those enlisted, are, after all the trouble and expense of forming them into soldiers, capable of performing only about 13 years servitude, exclusive of one year spent in drill, and that upwards of 40 per cent. are annually placed on the half-pension at 35 years of age.

in the prime of life, and at the very time when a man is considered at his best, it becomes a matter of serious consideration, whether, in our system of invaliding, we observe a due distinction between the temporarily enfeebled, and the permanently disabled ; and whether, in attending to the interests of the individual we do not overlook our duty to the State. It is laid down that no complaints that are curable, are valid grounds for discharging soldiers, which must stand undisputed as a general rule. Imposters are entitled to no consideration, but with us it is much to be feared they too often escape detection, and that pensions are granted where no serious disease exists.

53. In regard to the utility of a *triennial inspection* of pensioners, experience does not enable me to say much, as I have only been once engaged in that duty. On that occasion several men were recommended to be remanded to their Regiments as fit for duty, which recommendation was never, as far as I know, carried into effect, and I believe they continue to draw their pensions in undisturbed repose. The policy of such a measure, indeed, is very questionable, as such men would most likely prove unwilling and troublesome soldiers, and besides, Commanding Officers would never encourage them to remain in their corps. It would probably be far better to form them into a separate Battalion for garrison duty. By a return made to the War Office in 1843, according to a Bill passed in the former Session of Parliament, for embodying a certain number of out pensioners to save the country the expense of increasing the regular military force, it appears that there were then 95,000 pensioners on the military pension list, and that from 20,000 to 30,000, varying in age from 40 to 45 and 50 years, were considered able in body and health to form Veteran Battalions in case of necessity. The extreme age for replacing men on the strength of the Army seems to be 50 years. I have no means of ascertaining exactly the number of military pensioners on the Bombay list ; but excluding those transferred in the first instance to the Veteran Battalion and afterwards pensioned, about 3,244 men, must have been discharged during the last 14 years on the half pension, and the age of the survivors must vary from 36 to 50 years. About 1,085 men must during the last 9 years have received the two thirds pension, and the age of the survivors must vary from 41 to 50. The survivors therefore of 4,329, who are pensioners on the two lowest scales alone, must still be under 50 years of age. Of the casualties it is impossible to form any idea whatever, but, as I have no doubt many were not cases of permanent disability, and that youth and native air, even where the disease was of a serious nature, would effect a re-establishment of

health, I feel confident that, if the pension list were well sifted, a third of the above number, or nearly 1,450 men might at once be found who could take the garrison duties of both Surat and Asseerghur, and render available for more active service the two Regiments now required for these stations. Our Concan Sepoys seldom show much aversion to being transferred to the Veteran Battalion, but I have seen Hindostan men view with horror the possibility of being sent to do garrison duty in the Concan, and I have no doubt, they take the first opportunity of leaving it. Were the duties of Asseerghur transferred from troops of the Line to a Veteran Battalion, and our Hindostan men selected for it, it would be a great boon conferred upon them, as they would serve there much more willingly and no doubt for a longer time, it being so much nearer their native places and by many looked upon as in one of the Bengal provinces.

54. I intended to have made a few remarks on the diseases, for which, according to my experience, men are most frequently brought before the Invaliding Committees, but, in the absence of medical returns, any thing I can say could be looked on as nothing more than an approximation to accuracy. I shall therefore conclude with drawing a comparison between the invaliding in the Bengal Army, where the Committees are composed of medical men entirely, and in the Bombay Army, where three out of five members are not medical men. According to the data given at the beginning of this paper, and the information regarding invaliding in Bengal which I derived from Doctor Finch's valuable communication published in the Calcutta Medical Journal for 1843, it appears that the following are the proportions :

Average Service and Age on Retirement of Native Officers.

Bengal.		Bombay.	
Service.	Age.	Service.	Age.
38 Years.	58 Years.	30 Years.	48 Years.

Average Age and Service of Non-Commissioned Officers & Privates.

Bengal.		Bombay.	
Service.	Age.	Service.	Age.
25 years 11 months	46 years 8 months	18 years 8 months	36 years 6 months

The average number of men per Regiment invalided annually in Bengal is $10\frac{1}{3}$, while in Bombay it is $30\frac{3}{4}$; thus giving a number for the Bombay Army about equal to that of the Bengal Army, which is three times its strength.

ARTICLE II.

Notes on Small-Pox as observed in the Jamsetjee Jejeebhoy Hospital, in the months of December 1845, January, February, and March, 1846. By C. MOREHEAD, M. D.

Presented April, 1846.

The following is a tabular* statement of the number of admissions, and deaths from Small-pox, during these four months.

Years.	Months.	Remained.	Admitted.	Total.	Discharged.	Died.	Remaining.
1845	December .....	..	5	5	2	..	3
1846	January	3	10	13	4	5	4
"	February	4	8	12	2	6	4
"	March	4	26	30	7	12	11
	Total . . .		49		15	23	

It exhibits a mortality of 46 per cent. The fatal cases have, with very few exceptions, been markedly confluent in character, and death has

* With the view of still further illustrating some of the statements made in these notes,—the tabular statement of admissions into the Jamsetjee Jejeebhoy Hospital from Small-pox is here continued up to the 1st May 1847.

Years.	Months.	Remaining.	Admitted.	Total.	Discharged.	Died.	Remaining.
1846	April	11	9	20	9	6	5
"	May	5	7	12	3	2	7
"	June	7	1	8	2	1	5
"	July	5	..	5	5	..	..
"	August . . . . .	..	..	..	..	..	..
"	September . . . . .	..	..	..	..	..	..
"	October . . . . .	..	..	..	..	..	..
"	November . . . . .	..	..	..	..	..	..
"	December . . . . .	..	1	1	..	..	1
1847	January	1	1	2	1	..	1
"	February	1	..	1	..	1	..
"	March . . . . .	..	13	13	3	3	7
"	April	7	12	19	9	1	9
	Total		44		32	14	

May 1st 1847.

(Signed.) C. M.

taken place on the 3rd, 4th, 6th, 7th, 8th, 9th, 10th, and 11th days of the eruption.

The cases which have proved fatal before the 7th day of the eruption, have been generally instances in which the eruptive fever has been marked by very urgent symptoms, such as delirium, much anxiety, vomiting, pain of loins, badly developed pulse; and has extended beyond the usual period, having in two instances continued to the 5th day. These symptoms have been succeeded by a flat eruption, passing slowly from its papular to its vesicular state.

In these cases the urgent symptoms have somewhat abated on the first appearance of the eruption, but have in general recurred on the 2nd and succeeding days, and proved fatal about the 4th and 5th with delirium, sinking pulse and coma. Such form of fatal result is to be accounted for in a majority of cases, no doubt, by the circumstance of the febrile state being more or less congestive, and typhoid in its type. There are, however, I think, cases occasionally to be observed which prove fatal under very much the same train of symptoms, and at the same stage, in consequence of local congestions of blood taking place in important organs, e. g. the lungs, during the eruptive fever, and, by the fact of their presence, preventing the free development of the eruption. I have seen more than one case fatal on the 3rd and 4th day of a badly developed eruption, with complication of pneumonia marked by hurried breathing and rusty sputa, dating back to the period of the eruptive fever.

The cases fatal after the 7th day of the eruption (and they constitute the greater number), have been generally those in which the eruption has been copious and very confluent; in which there have been hoarseness, more or less dyspnoea and cough, present. These signs of laryngeal and tracheal irritation increase towards the end of the maturative fever, and prove fatal then, or in the early days of the secondary fever. The 11th has been the latest day of fatal termination.

In none of the fatal cases have the symptoms, usually termed malignant, been present, such as petechiæ, the pustules filling with dark coloured serum, hæmaturia or other hæmorrhages. In a few of the successful cases, glandular swellings, and the formation of small abscesses have been troublesome, during convalescence. In none of them has injured vision taken place.

The admissions from Small-pox have, with four exceptions, been confined to Moosulmans and Portuguese, many of the former were sailors, and probably strangers in Bombay. Several of the latter had recently ar-

rived from Goa. Of the affected with Small-pox seven were females; the rest males; the ages of 48 of the number were as follow :—

5	Years and under	4
15	— and under	3
15	— to 20	6
20	— to 30 inclusive.	29
30	— to 40	4
40	— to oldest 55	2
Total		48

I believe that almost all the admissions were of parties unprotected by vaccination or previous Small-pox, but on these points it is often impracticable to obtain, from the inmates of our hospitals, trust worthy information; for they are admitted, not unfrequently, at stages of the disease when incapable of giving a connected history of themselves and are often unattended by friends capable of supplying the deficiency. Of the admissions recorded in these notes, there was only one in which vaccination was undoubted and the marks on the arm distinct, and in this case the disease was very modified, and confined to a few vesicles on the face,—and this, though (as is usually observed) the eruptive fever had been very well marked. Whilst Small-pox has thus prevailed amongst that class of the adult Moosulman and Portuguese population, who have recourse to hospital relief, it is not to be doubted that the disease must also have existed to some extent, among the rest of the population of the Island, and especially amongst the young. But on this point we are entirely, I believe, without data, of any kind. An approximative record of the aggregate general mortality in the Island, and of that from cholera is kept, I understand, under the direction of the Police authorities, but nothing further. This state of matters is certainly to be regretted.

With the view of comparing the prevalence of Small-pox during the present season with the same season of previous years, as shewn in the returns of the Native General Hospital, I have annexed a table of the admissions and deaths, from Small-pox in that Hospital, for the last 17 years, from 1829 to 1845 inclusive.* The aggregate admissions amount to 445, the deaths to 129, being a mortality of 29. 2 per cent. Considering the state of destitution of a great proportion of the inmates usually admitted into that Hospital, and considering, that 1 in 4 is the average mortality from Small-pox in unprotected subjects in Europe, and that 30

* Extracted from Dr. McLennan's Report on Vaccination in Bombay.

per cent. is the rate in the London Small-pox Hospital, 29.2 in the Native General Hospital must be looked upon as very favourable. But in some of the years exhibited in the table, it is considerably lower, for example in 1844 when Small-pox was epidemic in Bombay, the mortality was as low as 20 per cent. But I believe that it would be altogether an erroneous inference to conclude from these data, that Small-pox in unprotected subjects is a less fatal disease in Bombay than in Europe. The low rate of mortality exhibited in the return for 1844, is, I believe, to a certain extent, to be attributed to the circumstances of cases of varicella having been included under the head "Small-pox." If care be taken to include only cases in which the disease is undoubted, and the subject unprotected, in all probability it will be found, that the rate of mortality 46 per cent. of the present season, is a nearer approximation to the true result of treatment among the inmates of the Native General Hospital.

During the five years from July 1828, to July 1843, the rate of mortality from Small-pox in the European General Hospital at Bombay, was 15.6 per cent., but here, without doubt, the favourable rate is to be attributed to the modifying influence exercised by vaccination in many of the cases.

From the annexed tabular statement, it appears that Small-pox is much more apt to prevail in Bombay in some months than in others; for example, of the 445 cases, 383 occurred from the 1st January to the 1st July, and of them 143 or nearly one third of the whole in the month of March. But in the half year from 1st July to 1st January, only 62 instances; and throughout the 17 years not a single admission is recorded in the month of October, only 2 in September, 3 in August, 5 in November, and 14 in December. The months of greatest prevalence after March, are February, April, May, July, January, and June, in the order in which they are here entered. In the European General Hospital, the admissions from Small-pox, in the five years from July 1838 to July 1843, amounted to 32; of these 25 took place in the months of January, February, March, and April; 4 in the month of November, that of 1839, and 3, 1 in each month, in May, June, and July; and in the months of August, September, October, and December, there was not, during these five years, a single admission from Small-pox.

In the report drawn up by Dr. Stuart, Superintendent of Vaccination in Bengal, of the Small-pox which prevailed in Calcutta, in the years 1833, 1838, and 1843, the circumstance of the disease prevailing in some months, and not in others, is also very remarkable, and in perfect coincidence with what has been stated above of the disease in Bombay. The Tables in Dr. Stuart's report, are drawn up from the Re-

gister of deaths kept by the Police authorities, and on referring to the record for the years 1844, a year in which Small-pox was also epidemic in Bombay, we find the following result :--

January	157
February	455
March	963
April	756
May	375
June	150
July	45
August	13
September	6
October	2
	<hr/> 2,922

The total deaths amount to 2,922, and of these 2,856 took place from 1st January to 1st July, and 66 from 1st July to 1st November. Of November and December there is not any record. May it be laid down then as a law of epidemic Small-pox in India, that its seasons of prevalence are the winter and spring, and those of absence, the summer, and autumn ?

A similar characteristic, but much less marked, may probably be observed of Small-pox epidemics as occurring in Europe. Sydenham distinctly states that the season about the vernal equinox is that most favourable to epidemic Small-pox ; and the same fact may be traced more or less through Huxham's " Observations on Air and Epidemics." In the 2d Annual Report of the Registrar General of births, deaths, and marriages in England, there is an account of an epidemic Small-pox in England in the years 1838, 1839, in which, I think the law may be traced, but not so markedly as in the Calcutta record. For example from 1st January to 1st July of 1838, there were 8,631 deaths from Small-pox ; from 1st July to 1st January, 7,536 deaths, being a decrease of 1,095, in the last half year. From January to July 1839, there were 5,487 deaths, but from July to January 1840, there were 3,263, being a decrease in the summer and autumn of 2,224.

Though, then, this law of epidemic Small-pox is not peculiar but only more marked in tropical countries, it is only, as far as I am aware, in this country, that a similar law has been observed in a remarkable way to influence the propagation of the vaccine disease.

Now that there is not, any longer, doubt in regard to the identity of Small-pox and Cow-pox, the difficulty of propagating the latter in some parts of India during the hot months may be considered as in accordance with the epidemic law, and as additional evidence of the identity of the

two diseases. The difficulty which has attended the propagation of the vaccine disease in some months, in some of the Bengal Provinces, has been the subject of much discussion, and too much weight has in all probability been attached to it, as an *impediment* in the way of the diffusion of the protective influence of vaccination in India. While the law of preference of certain seasons has been so much dwelt on with reference to the Cow-pox, it has been too much lost sight of in regard to the Small-pox. For what is the practical inference? It is this: If, in the seasons in which there is difficulty, if not impracticability, in propagating the vaccine disease in its perfect form, there is also very seldom prevalence of epidemic Small-pox—does it not follow that this obstacle to the diffusion of the vaccine is a matter of no great regret, and speaking generally, the absence of vaccination in these seasons no great evil, because there is no great demand for the exercise of its protective influence? While, on the contrary, if the seasons, to which epidemic Small-pox is almost exclusively confined, are those, or immediately succeed those, in which there is no difficulty in keeping up the vaccine disease,—then, does it not follow that vaccination, assiduously and carefully practised in those seasons, will afford to the people almost the full measure of its protection?

On the opposite page will be found a Return of the Small-pox cases to which I have referred.

Return of Small-Pox cases in the Native General Hospital from the 1st January 1829, to the 31st July 1844.

Years.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.		Years of Total.		Per cent. of deaths on Admission.
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	
1829	6	2	1	4	3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	8	22.2	
1830	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	8	44.4	
1831	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	20.0	
1832	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	3	60.0	
1833	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	50.0	
1834	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	54	18	33.3	
1835	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13	1	7.6	
1836	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	42	10	23.8	
1837	8	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	15	1	6.6	
1838	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34	14	41.1	
1839	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34	10	29.4	
1840	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30.4	
1841	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23	7	30.4	
1842	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	54	21	38.8	
1843	6	4	16	7	21	7	6	3	3	4	1	1	4	1	1	1	1	1	1	1	1	1	1	104	21	20.1	
1844	4	2	36	9	56	9	6	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	32	11	34.3	
1845	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29.2	
	38	13	76	21	143	27	58	16	41	18	27	11	38	16	3	1	2	2	1	1	5	1	14	3	445	129	

ARTICLE III.

On the Prevalence of Intermittent Fever among the Troops assembled at Hydrabad in Sindh, during the Autumn of 1843.

By H. J. CARTER, Esq. Assistant Surgeon.

Presented October, 1846.

In submitting the following observations and statistical returns to the Society, my object is to furnish a short record of the prevalence of Intermittent Fever which took place among the troops quartered in and about the town of Hydrabad in Sindh, during the autumnal months of 1843.

The success which attended General Sir Charles Napier at the battle of Hydrabad on the 24th of March of that year, having put an end to all the principal hostile movements in Sindh, Sir Charles after a few days' marching, returned to Hydrabad, where he found ample room for quartering his native regiments in the deserted houses and villages of people, who had either perished at the battles of Meanee or Hydrabad, or who, with their wives and families, had forever fled from homes no longer welcome to them under the dominion of a foreign power; meanwhile, the detachment that was sent on to take possession of Omarkote, (of which for sometime I was in medical charge,) having accomplished its object, returned to Hydrabad in the second week of April, when all the regiments had become fairly settled down, and were in the healthful enjoyment of that ease and relaxation which generally follow a cessation of hard campaigns and harassing duty.

It is from this time that the observations and statistical returns I have to offer will commence; but before entering upon them, it is desirable that I should premise a description of the general character of the country round Hydrabad, of the position of the town itself, of the neighbouring localities in which the different regiments were quartered, and of the physical features of the ground in their immediate vicinity.

So far as regards the general character of that part of Sindh with which we are now most concerned, a brief description will suffice,—little

more can be said, than that it consists of a range of low, truncated hills, in the midst of a vast alluvial plain. This range, averaging in height from thirty to sixty feet above the level of the surrounding country, follows for about twelve miles the left bank of the river Indus. It is characterized by its light colour, its barren aspect, and its isolated position in the alluvial plain of the river just mentioned, having no other high land visible from it in any direction but the Hala range, from the lower hills of which it is separated by the river Indus and the plain on the opposite side of it. In composition, it consists of a cretaceous, marly formation, interstratified with nodular fawn-coloured limestone, which in descending, becomes more ochreous, plastic, and compact. The alluvial deposit on the other hand, which with but little variation presents a plain of the same level in every direction, is for the most part covered with shrubs, trees, and rich cultivation, while in many other places it is equally barren and unprofitable; the dark coloured plastic earth of which it is composed, agrees in most of its properties with the cretaceous formation of the hills, from which in all probability it has principally been derived.

On the northernmost extremity of the range of hills just described, stands the town of Hyderabad, where it has been built on a portion isolated from the main body of the range by the intervention of a strip of the alluvial plain. This detached portion, which for the sake of distinction we will call the hill of Hyderabad, covers an area of about two and a half square miles. It is of an irregular quadrilateral figure, with sides most precipitous round the highest points of elevation; the surface of its summit is uneven, and presents two ridges separated by a valley; the ridges are from forty to fifty feet high, while the valley in its lowest part, descends to within a few feet of the level of the alluvial plain. On the south-eastern corner of this quadrangular mound, are situated the town and fort of Hyderabad.

From a description of the position of the capital of Sindh and its surrounding country, we proceed to the more detailed one of the sites occupied by the different regiments, and of the physical features of the ground in their immediate vicinity; assuming, when not otherwise mentioned, that all were present at Hyderabad on the first of April.

In the fort of Hyderabad, which standing on the extremity of the ridge on which the town has been built, marks the south-eastern angle of the hill to which we have given the same designation, the 12th Regiment N. I. was quartered; and on the ridge opposite, in the deserted village of *Meer Mahomed Khan ka tanda*, which is situated near the south-western angle of the hill just mentioned, was the 21st Regt. N. I. Sub-

sequently II. M. 28th. Regt. which arrived in the month of May, took up its quarters also in the fort, and in the beginning of June, the 20th Regiment N. I. entered and occupied the forsaken houses in that part of the town adjoining it. With the exception of the Sindh Horse, which arrived still later and took up its position in the valley below, these were all the regiments that were stationed on the hill of Hydrabad, and all that were in localities elevated above the level of the surrounding country; until the 9th of September, when the 15th Regiment N. I., which since the 9th of June had been quartered in *Geedo ka tanda*, (a little village on the left bank of the river Indus, about a mile above the entrenched camp) was ordered to move to the ridge near the lines of the 21st Regiment N. I. on account of the rapid manner in which intermittent fever was spreading among the Sepoys. On the alluvial plain to the east of Hydrabad, were located the 6th and 8th Regiments N. I., the latter in the village of *Meer Mohomed ka tanda*, between Hydrabad and the neighbouring branch of the Indus called the Fullayle, and the former on the other side of this river, in *Mahomed Khan ka tanda*, a village situated some little distance from its left bank: while to the west, were the Artillery and Cavalry, in the entrenched camp, which was situated close to the left bank of the river Indus, about three miles below Hydrabad.

The plain surrounding Hydrabad, is chiefly characterized by the numerous canals and old ditches with which it is intersected; these were originally dug for the purpose of conveying water to the cultivated grounds during the months of irrigation, but most of them having long fallen into disuse, have become neglected, and now allow the water to flow uninterruptedly over their banks and to inundate the places through which they pass; while the immediate vicinity of the large towns presents a confusion of trenches and irregular excavations, proportioned in magnitude to the quantity of material that has been required for building the houses in their neighbourhood; into these the water has free ingress during the inundation, and being deeper than the canals which lead to them, they retain it in a putrescent state for a considerable period after it has subsided in every other part of the surrounding country. In 1843, this was particularly the case round the town and fort of Hydrabad, the village occupied by the 21st Regiment N. I. and that in which the 8th Regiment N. I. was quartered. Neither about the entrenched camp, nor I think about the village in which the 6th Regiment N. I. was quartered, are the irregularities of the surface of the ground to be compared in number or extent to those around Hydrabad, nor are they of any magnitude about the little village in which the 15th Regiment

N. I. was first quartered, but the latter in other respects, was situated in a part intersected by numerous water courses, and in the midst of high trees, jungle, and jowaree fields.

Such is the general character of the country surrounding Hyderabad, and such were the physical features of the surface of the ground in the immediate vicinity of the sites occupied by the different Regiments. The following statistical returns will now furnish monthly statements of the number of cases of fever that occurred in each Regiment from the time of its arrival at Hyderabad in 1843, to the end of the same year; and the subjoined notes, though not so complete as I could wish, will it is hoped, in lieu of nothing better, afford a general outline of the state of the weather during the same period. It is requisite however to remark here, that in the total numbers of cases of fever in each monthly report, are included those which were not discharged from the Hospital at the end of the preceding month.

April.

Regiment.	Strength.	Fevers.	Deaths.
3rd Cav.	306	7	2
9th Cav.	485	20	.
8th N. I.	589	46	.
12th N. I.	920	76	.
21st N. I.	899	28	1

Weather of this month clear, dry, windy and temperate.

May.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art . . .	81	52	1
2d Co. 2d Batl . .	106	35	2
3d Cav. Colund . .	58	14	"
3d Cav.	283	47	.
9th Cav.	376	174	2
8th N. I.	599	264	.
12th N. I.	908	116	3
21st N. I.	815	125	1

Weather oppressively hot; many of the sepoys were attacked with intermittent fever, chiefly of a quotidian form. About the middle of the month there were storms accompanied by thunder with a few drops of rain, and on the 28th, a strong southerly wind began to blow, with the temperature of the atmosphere varying from 90.° to 102.° Fabr.

June.

Regiment.	Strength.	Fevers.	Deaths.
9th T. H. Art. . . .	71	106	10
2d Co. 2nd Battl. .	95	85	6
3rd Cav.	407	78	.
9th Cav.	479	313	2
8th N. I.	669	425	5
12th N. I.	909	152	1
15th N. I.	887	97	1
20th N. I.	861	72	.
21st N. I.	861	207	.

In this month the southerly wind blew steadily and at times very strong, bringing with it much humidity. Between the 10th, and 21st, Sir C. Napier undertook his march to and from Nasseerpoor, where apoplectic attacks of fever were fatal to many Europeans during the first paroxysm. The temperature at Nasseerpore was 116.° Fahr. in tents.

July.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art. . . .	65	39	1
2d Co. 2d Battl. . .	87	49	1
3d Co. Golund. . . .	96	8	.
3d Cav.	407	48	2
9th Cav.	478	144	1
6th N. I.	904	20	.
8th N. I.	747	155	2
12th N. I.	908	51	1
15th N. I.	958	44	4
20th N. I.	881	100	.
21st N. I.	985	59	1

In the beginning of July, the strong southerly wind that had been blowing more or less since the 28th of May, abated; the sky became clouded on the 7th and 8th, and the wind blew from the N. W.; on the 9th, there was a heavy fall of rain and the atmosphere continued cloudy for several days afterwards with the wind from the N. E., the weather then cleared up again, and the wind returned to the south. From the 18th to the 22nd, water began to flow through the canals and the inundation rapidly extended itself to the inequalities of the plain; the weather again became cloudy, and on the 23rd, heavy rain fell. During the remaining part of the month, the atmosphere though more or less unsettled, was cool and moist.

August.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art . . .			
2nd Co. 2nd Batl . .	84	32	2
3rd Co. Golund. . .	98	6	.
3rd Cav.	407	37	.
6th N. I.	904	62	1
8th N. I.	910	92	1
12th N. I.	728	47	1
15th N. I.	1012	153	3
20th N. I.	879	101	2
21st N. I.	975	69	.

From the commencement of this month to the 18th, the wind blew strongly from the south, with for the most part a cloudless atmosphere. Rheumatism prevailed among the sepoys. On the 18th the southerly wind abated, and on the 22nd shifted to the north; after a fall of rain it again returned to the south, where it continued throughout the latter part this month.

September.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art.	64	22	.
2nd Co. 2nd Batt. .	84	23	.
3rd Co. Golund. . .	98	13	.
3rd Cavalry	311	55	.
9th Cav.	397	56	.
6th N. I.	1023	163	.
8th N. I.	915	127	.
2th N. I.	715	57	1
15th N. I.	1046	580	6
20th N. I.	877	127	2
21st N. I.	963	192	2

The month of September commenced with furious squalls, accompanied by lightning, thunder, and heavy rain, after which, the atmosphere became clearer, and the weather calmer and more settled than it had been since the month of June. The wind still continued to blow from the S. and S. W. strengthening towards the new moon. After the 28th, the sun's direct rays became almost insupportable, the sky was bright and clear, the nights and mornings were cool and fresh, and it was also cool in the shade during the day. The water began to subside in this month, and with it intermittent fevers rapidly began to invade the sepoys. On the 9th, the 15th Regiment N. I. having more than 500 sepoys in Hospital, it was ordered speedily to vacate its station near the river, and to pitch tents close to the lines of the 21st Regiment N. I.

October.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art. .	56	73	.
2nd Co. 2nd Batt.	72	90	5
3rd Co. Golund. .	98	53	.
3rd Cav.	371	263	2
9th Cav.	398	301	.
6th N. I.	765	559	2
8th N. I.	928	371	10*
12th N. I.	732	364	1
15th N. I.	1024	973	6†
20th N. I.	1002	273	4
21st N. I.	961	944	8

South and S. W. winds shifting to the N. with a bright clear sky characterized the state of the weather at the commencement of this month; light and variable winds followed, blowing from the S. and S. W. and from the N. and N. E. The direct rays of the sun were still powerful in the middle of the day.

November.

Regiment.	Strength.	Fevers.	Deaths.
1st T. H. Art. . .	56	84	.
3rd C. Golund. . .	98	59	.
3rd Cav.	332	324	5
9th Cav.	309	359	8
6th N. I.	880	987	5
8th N. I.	865	778	10
12th N. I.	729	712	6
15th N. I.	998	1095	32
20th N. I.	944	943	13
21st N. I.	986	922	20

After the 4th of this month, the wind blew steadily for three days from the N. when the sky again became cloudy and the wind variable. The temperature of the atmosphere had become decidedly cooler, though it was still very hot in the sun's rays in the middle of the day. Towards the 20th the sky became clouded, and threatened squalls, with a strong northerly wind; a few drops of rain fell and clouds of dust began to prove that the waters had dried up, and that the long wished for *Shimal* or northwind, had at last set in.

* 7 Only of fever.

† 5 Only of fever.

December.

Regiment.	Strength.	Fevers.	Deaths
9th Ben Cav. . .	313	308	9
6th N. I.	380	882	1
8th N. I.	891	458	16
12th N. I.	728	621	1
15th N. I.	948	896	25
20th N. I.	1022	811	17
21st N. I.	687	817	46

During this month the 21st Regiment N. I. to which I was attached, having become totally unfit for service, was transferred in boats from Hyderabad to Kurrachee. The weather I believe was fair and settled, but the confusion and fatigue which attended the moving of the Regiment and latterly my own sickness, prevented me from taking any notes of it.

From the foregoing reports, it will be seen that the Native Regiments afforded by far the largest number of men, and that they were among the first to be stationed at Hyderabad, and the last (long after the autumnal fever had made its appearance,) to leave that town; hence it is chiefly from their Hospital Returns that we must judge of the commencement, the progress, and the prevalence of the disease.

For a description of the fever, I must confine myself entirely to what came under my observation in the 21st Regiment N. I. for no Medical Officer at that time had leisure to study the form of a disease in other corps, which was so prevalent in his own Regiment as to demand the whole of his attention; nor, for the same reason, was it necessary to go beyond the number of cases which occurred in one Regiment, for a typical description of the fever as it prevailed throughout the whole camp. The symptoms of derangement of the biliary organs which accompanied it, entitled it to the specific distinction of "*bilious intermittent*. Its commencement was sudden; pains in the body and limbs, bilious vomiting, high coloured urine, and costive bowels, were sooner or later followed by a severe paroxysm of fever. The type was generally quotidian, sometimes tertian, sometimes the periods of intermission were irregular, and occasionally the fever was remittent, rarely continued. The paroxysm generally lasted from eight to ten hours, and was complete in all its stages of cold, heat, and perspiration; there were however several instances of irregularity, in which the development of one of the stages was incomplete, two of the stages existed without the third, and it was by no means uncommon for the patient to experience the

cold stage only. When the fever made its appearance, the accession generally took place about twelve o'clock or towards the hottest part of the day, while at a subsequent period, when the nights began to grow cold, it as often came on at midnight. Its liability to recur at short intervals was certainly the worst character of this disease; the average period between the attacks including convalescence, *i. e.* from the time the patient was discharged from the hospital to the date of his re-admission, did not exceed four days. Local inflammation seldom presented itself, but the symptoms of local congestion were occasionally severe. The fever frequently commenced with vomiting of blood, always of bilious matter, and sometimes it terminated with a discharge of blood by the anus; profuse bleedings from the nose attended it, singing in the ears, amaurotic affections and violent nervous pains of the head; and towards the end of the month of November, when the patient had become reduced to a state of extreme debility by repeated attacks of the disease, the throbbing pain of the head, deafness, and vertigo, that occurred on lying down, frequently terrified him from assuming a horizontal position. When in the first part of the autumn a fatal case occurred, it generally took place during an attack of quotidian fever; after several severe accessions, insensibility came on during a paroxysm and terminated in death; latterly however, dysentery supervening upon a debilitated constitution, rapidly put a period to the existence of all who were attacked by it.

The *predisposing cause* of this fever was almost anything that agitated, irritated, or produced a shock throughout the nervous system; in one instance the sting of a wasp was followed by a paroxysm of fever, in a second the extraction of a tooth, in a third the commencement of gonorrhœa, where the discharge was immediately arrested, but returned after the attack, in a fourth, rheumatism; while affections that at any other time would have been termed simply *bilious attacks*, were accompanied by paroxysms of fever, and terminated in jaundice.

The *treatment*, adopted, was simply that of administering emetics followed by gentle purgatives and quinine, modified according to circumstances; and unless symptoms of a graver nature required more active measures, which was not often the case, it seldom failed to cure the patient, but this merely shortened the attack, the *exciting cause* still remained.

It may easily be conceived how the recurrence of this fever at such short intervals, soon transferred the whole of the regiment from the lines to the hospital; and as all classes were indiscriminately attacked and suffered equally, the Medical Officer in his turn did not escape the general epidemic, but was occasionally rendered as unfit for duty by it as

other people ; his sickness however was naturally regarded as a matter of much more consequence than that of any other person, on account of the many hundreds of Sepoys who at that time were daily requiring his assistance, and whose general comforts depended on his presence, almost as much as their medical treatment ; it therefore not unfrequently happened, that the demand for more medical aid, became far greater than it was possible to supply. As an instance of this, I may be pardoned for relating what no doubt had its parallel with others, and perhaps was experienced to a greater extent, but at that time few medical men thought of extending their observations beyond the lines of their own regiments ; there was quite enough within their limits to occupy their whole attention, and they therefore had little leisure, however much they might have possessed the desire, to interest themselves in any thing which did not immediately concern their own duty ; those who were well, acted for others who were sick, but as no one remained well long, there were sometimes very few at all left to act ; not that there was a scarcity of Medical Officers in the camp, but on account of the extreme prevalence of the disease, they like the rest, were all more or less unfitted for duty. For upwards of a fortnight in the month of October, I was the only Medical Officer in charge of the 15th and 21st Regiments N. I. and of 500 camp followers and prisoners, who were employed in erecting some new buildings near the 21st Regt. In the two regiments alone for this month, the number of admissions into their respective hospitals amounted to a total of 1,917. No one for a moment will suppose that under such circumstances, (with two-thirds of this charge constantly in hospital,) either the medical treatment, or the commonest wants of the Sepoys could have been properly attended to ; but there was no alternative ; insufficient as one Medical Officer was for the performance of this duty, it was all that at that time could be allowed for it ; and this must ever be the case when an epidemic becomes so prevalent as to allow no one to escape its influence ; whether its form be simple or malignant, among thousands or among a few, the inevitable consequence must sooner or later follow, of an almost total want, not only of medical, but of all other attendance which is as requisite in sickness, as it is indispensable in recovery ; and had our disease been a little more fatal, the living would no more have been able to bury the dead, than they were in the time of Caius, who records this of the intermittent fever which prevailed in London in 1551.* Indeed, to a crisis somewhat resembling that, it had arrived in the hospital of the 21st

* De Ephemera Britannica.

Regt. N. I. between the 14th and 19th of November, when the whole of the Subordinate Medical Establishment, with the exception of a few camp-followers, left the dispensary, to place themselves in the hospital among the patients to whom they had been giving their attendance. At this particular time the Sepoys appeared to have become apathetic and unconscious of every thing but their own sufferings, their comrades were dying before their eyes unnoticed, and on two or three occasions while walking round the hospital alone, early in the morning, I found a man stiff and cold, lying between others, who, though they were touching the corpse of the dead man with their own bodies, were unconscious that his death had taken place.

I may here mention, that at no time have I ever seen the restrictions in caste, act so prejudicially towards the interest of those encumbered with it, as in this instance. It not unfrequently happened, that all the Sepoys of a certain caste, (of which there were few in the Regiment,) became sick, and being unable to prepare food for themselves, resisted all entreaties to take it from the hands of others; persisting in this until their convalescence, the disease again returned upon them with redoubled violence in their half-starved state, and they only consented to be fed by strangers to their own caste, when they were past all hopes of recovery, and were almost unconscious of the nature of the food that was administered to them.

Such is a short account of the Intermittent Fever, which at Hyderabad in Sindh in the autumn of 1843, reduced in a few weeks, whole Regiments of Sepoys, from cheerfulness, activity, and strength, to a condition of helplessness, hopeless of recovery, unserviceable for duty, and a burthen to the State.

ARTICLE IV.

Note on the supposed uses of the Bile in the Function of Digestion. By C. MOREHEAD, M. D.

Presented April, 1847.

In the "Notes on the Pathology and Treatment of Dysentery," which I some time since submitted to the Society, and which were published in the 7th No. of the "Transactions," the following statement is made in a foot-note at page 147.

"These remarks are grounded in a great measure on the belief, that the feculent discharges from the bowels consist chiefly of the mucous secretions or excretions from the whole tract of the the small intestine intermixed with the bile, in whole, or in part. And further, that whatever may be the other uses of the bile, it is one, and probably not an unimportant one, to lessen the adhesiveness of the intestinal mucus and facilitate its separation from the mucous lining, and its transmission through the bowels. Let any one who doubts this, adopt the practice of generally opening the small intestine, and observe its contents from the duodenum downwards;—he will observe the contents, in the upper part mucous and adhesive, becoming less tenacious as they descend and are intermixed with bile, assuming gradually the appearance of feculence, till at the end of the ileum the only difference between its contents and that of the large intestine is that in the former they are less consistent."

"That when there is an unassimilable residuum of the food, such goes to form part of the feculence, is not to be disputed, but that the feculence consists entirely or in a great measure of such residue, is an opinion not reconcilable with the state of the small intestines as generally found after death. Nor is this consideration immaterial, it has several important bearings on practice."

On that part of the above quotation which states, "and further that whatever may be the other uses of the bile, it is one, and probably not an unimportant one, to lessen the adhesiveness of the intestinal mucus, and faci-

litate its separation from the mucous lining and its transmission through the bowels," I am desirous of submitting a few further observations to the Society.

I should wish it however, in the first place, to be clearly understood, that I altogether leave out of present consideration, the various opinions which have been entertained of the importance, to the animal economy, of the biliary secretion viewed in its light of an excretion, *i. e.* as a means by which noxious materials are eliminated from the blood. Not from any idea that this purpose served by it is unimportant and not well founded,—but because it does not bear upon the direct action of the bile in aiding the process of digestion,—the subject to which my present remarks are intended to be confined.

By the process of digestion I understand all those changes which the alimentary mass undergoes between the period of its reception into the stomach and that of its being brought in the form of chyle, in such state, and in such relation to the lacteals, as to be absorbable by them. In what manner does the bile assist in this process?

It is generally believed that, when the chyme passes from the stomach into the duodenum, then the bile flows into the intestine, mixes with the chyme, and exercises on it one or other or all of the following actions : 1st. It separates the unassimilable from the assimilable portion of the chyme, and this residuum of the food uniting with one or more constituents of the bile is passed on through the intestinal canal as excrementitious,—its passage being aided by the constituents of the bile present in it acting as a stimulus to the peristaltic action of the bowel.—2nd. The chyme, in the condition in which it passes from the stomach, is said to have an acid reaction, and is supposed to be rendered neutral by the soda which exists in the bile.—3d. Supposing that a portion only of the constituents of the bile have passed away with the residuum of the food, it is held that the fatty acid constituents, probably in the form of a soap,—from union with soda,—remain behind and act on the assimilable portion of the chyme which has also been left, and which may be designated intestinal chyle. The result of this action is supposed to be either that of assimilating somewhat the albumen, as existing in the intestinal chyle, to that more highly elaborated condition in which it is found in the chyle of the lacteals,—or the action is believed to be exerted on the oily constituents of the food, and to render them somewhat soluble and more readily absorbable by the lacteals.

It is not pretended that all those opinions are entertained by any one

physiologist.—But I believe that a tolerably accurate summary has been given of the opinions which have been, or still are entertained of the modes in which the bile directly assists in the process of digestion. They are however, I apprehend, only to be received as opinions more or less plausible,—for their accuracy has never, it may be presumed, been proved by direct demonstration: of this in all probability the nature of the enquiry is not susceptible.

In the latest observations on the anatomy and functions of the intestinal mucous lining,* it is held that, while the process of digestion is not going on, the mucous surface, that of the villi as well as the follicles, is covered with a layer of epithelium and with the mucus the secretion of the epithelial cells. When however the process of digestion is in progress, and it becomes necessary that the lacteals should absorb the chyle,—then the layer of epithelium is thrown off, and the villi are left bare. Mr. Goodsir observes, “As the chyme begins to pass along the small intestine, an increased quantity of blood circulates in the capillaries of the gut. In consequence of this increased flow of blood, *or from some other cause with which I am not yet acquainted*, the internal surface of the gut throws off its epithelium, which is intermixed with the chyme in the cavity of the gut.”

Two very important functions, then, are performed by the mucous surface of the small intestines. When digestion is at rest, the absorbing villi are protected by a layer of epithelium, and the follicles are secreting mucus, which is partly to be considered an excretion, partly an additional protection of the mucous surface. In the last stages of digestion, the mucous surface by means of its villi becomes an actively absorbing organ; but to fit it for this purpose, it is necessary, as stated above, that the layer of epithelium should be thrown off and the villi be left naked.

The removal then of the layer of epithelium must be viewed as a very important part of the digestive process,—for without it, the last stages of the function,—that in which the intestinal chyle is brought into such relation with the lacteals as to render its absorption practicable, cannot be completed. And yet I am not aware that in the various theories of the function of digestion, there is any attempt made to explain by what means the inner surface of the intestine,—secreting and covered with secretion for its protection,—becomes all at once fitted for active absorption. This omission is the more remarkable, because in other instances, wherever there is a temporary epithelium or mucus secreted on a surface where its

* Goodsir's Anatomical and Pathological Observations.

presence is intended to be only for a time,—we find some provision made for effecting its removal. The debris of the epithelial cells of the epidermis, for example, is removed by the friction to which the surface of the body is naturally exposed. The mucus of the bronchial tubes and cells, where its presence might interfere with absorption is, we know, removed by the action of the cilia with which its epithelium is furnished.

That a provision of some kind exists for the separation of the epithelium and mucus from the intestinal surface in order that this surface may be fitted for absorption, when required to absorb, is, to say the least, an extremely probable supposition, and the suggestion which was made by me, in the note which I have quoted at the commencement of these remarks, viz. “that whatever may be the other uses of the bile, it is one and probably not an unimportant one, to lessen the adhesiveness of the intestinal mucus and facilitate its separation from the mucous lining, and its transmission through the bowels,” which consequently attributes to the bile, the action of removing the epithelium and mucus from the surface of the villi,—is probably not without plausibility.

This view occurred to my mind, solely from observing, in frequent examinations of the small intestines after death, how the adhesiveness of the mucus and its separability from the intestinal surface, lessened in degree according as the mucus became more or less mixed with bile.

In order to entertain this view, however, it would seem necessary to assume that the bile flows into the duodenum rather before the passage of the chyme from the stomach, than when the duodenum is filled with chyme. May it be that the bile flowing into the intestine, before the chyme is admitted, removes the epithelial layer and mucus, and fits the surface for absorption; that then the chyme passing into the duodenum may become mixed with the pancreatic secretion, thereby be diluted, probably further acted upon, and better fitted for being absorbed into the lacteals?

When we recollect the analogy between the saliva and the pancreatic fluid, the recent discovery of ptyaline in the saliva and its probable analogy to the pepsin of the gastric juice, the not improbable idea that the ptyaline commences that kind of solvent action on the food which is continued by the pepsin and acids of the gastric juice; when we recollect these circumstances, the supposition is perhaps sufficiently plausible, that the pancreatic fluid, in virtue of a principle analogous to ptyaline and pepsin, may perfect the reducing process commenced by the saliva and advanced by the gastric juice. At all events the question may be put. Is the concluding stage of the process of digestion not as likely to be effect-

ed by the pancreatic fluid which has analogies with the fluids concerned in its anterior stages,—as by admixture of the chyme with the bile a heterogeneous compound, in part undoubtedly excrementitious, and having no analogy with the fluids by which the previous stages of the process have been effected?

The secretion of intestinal mucus is in part looked upon as an excretion, as a means of eliminating noxious materials from the blood. But while absorption is going on from the mucous surface, this excretion must be suspended. The arterial capillaries, from which it ought to be eliminated, pass on their unpurified blood to the venous radicles with which they communicate. These venous radicles go to form the portal vein, and in consequence, this unpurified blood is carried to the secreting texture of the liver,—and is in fact the blood from which the bile is secreted. May it not then be, that the elimination of material which takes place from the blood at the intestinal mucous surface, when digestion is not going on—is, in fact effected by the liver when the intestinal surface has become an absorbing one, and elimination by it is, in consequence, suspended? In other words, that when the intestinal surface is secreting little, or not secreting at all, then the liver is secreting much, and vice versa.

I am unwilling to extend speculations of this kind. But it seems to me that the idea, that the bile is the means of freeing the intestinal mucous surface from epithelium and mucus, and fitting it for absorption, is supported by various pathological conditions. To one of these I shall make allusion. The state of the tongue may be viewed as an indication of that of the intestinal mucous membrane. When the tongue is coated, it may be inferred that the intestinal mucous membrane is also coated with epithelium and mucus, and quite unfitted for the last and important stage of the function of digestion. No wonder then that this state of the tongue should be accompanied with nausea, want of appetite and the train of symptoms termed bilious; and that these should be removed by means which, by increasing the biliary secretion, *i. e.* which, according to the view of the supposed use of that secretion, supply in greater quantity the effective agency by which the epithelial debris and mucus may be removed. These remarks I submit to the Society with much diffidence.

ARTICLE V.

A Description of the Malignant Pustule as communicated from the Elephant. By ELIJAH IMPEY, Esq. Assistant Surgeon.

 Presented May, 1847.

The appearance of a disease, in India so rare, and in many particulars so analogous to the Malignant Pustule, (the *Charbon* of the French, and *Milz-brand* of the German nosological systems), occurring as it has done among Europeans, inflicted by a poison derived from the animal kingdom, and arising at the dissection of an animal to whom it has never yet been traced, is a circumstance, which cannot but be generally interesting to the Physician, as well as to the Medical Physiologist.

Elephants, as they exist with us in a domesticated state, seldom if ever die a natural death, if we account as such, old age, or sheer exhaustion of the vital powers; and more rarely still, do Europeans interest themselves in their remains, otherwise perhaps the popular belief regarding the evils attendant upon their dissection, which experience has taught the Natives of India, might have been a matter of notoriety, or at least, been received with greater credence than was attached to it in the present instance; for the supposition is by no means a limited one, but attributable generally to the blood of the Elephant, without reference to the cause of death, whether resulting from accident or disease.

It is not the less important however now to know, that a formidable disorder, attended with considerable danger and risk to life, is to be apprehended by those, who, whether for scientific purposes or interested motives, engage personally in the autopsy or anatomical examination of the Elephant, where death, as in the present case at least, has been caused by disease,—and that the noxious matter is propagated by direct contact, the disease being communicated by inoculation through the exposed parts of the body. Not even by Sportsmen who have the best and most frequent opportunities of observation, and of acquiring information on this head, and writers on Ceylon in particular, where elephant-hunting is both an ordinary amusement, as well as a lucrative pursuit, is it any where recorded, as well as my memory serves me, that evil consequences

resulted, either from the extraction of the tusks and teeth, or the removal of the various parts which form the *spolia opima* of the huntsman; nor is it remarked, that any precautions were taken to guard against danger; and the inference that naturally suggests itself from such silence, would seem to be, that in the natural state of health in which wild animals, more immediately Elephants are usually met with, the disease has not been noticed, at least has not infected mankind, the principle which is productive of it, not being in a state of activity; and, that it is only when death occurs in them from disease, or from a particular disease, and if they are destroyed while under its influence, that the virus manifests itself, and is called into existence. The probability of such a contingency as this latter, may readily be conceived, but being contrary to the popular opinion, (which, as before stated, attributes to the blood alone, the deleterious properties above mentioned,) requires more extended experience and observation to determine.

It remains however to be seen which conjecture will be best borne out in the sequel, to define what the affection in the human subject is, and the resemblance it bears to Malignant Pustule. Assuming the disease to be of the latter kind, one fact would appear to be already established, that the Malignant Pustule, as has hitherto been supposed, is not confined to horned cattle, or engendered solely by any morbid alteration or distempers to which they alone are subject; and judging from the subsequent examples as regards the Elephant, I should be inclined to add, that it did not proceed from any putrefactive tendency in the animal, (for dissection took place too early to admit the supposition, and this process is known to arrest malignity of disposition in disease,) but on the contrary, from some peculiar condition of the blood, that existed during life in its normal state, or from a septic principle, generated during the course of the disease that caused the animal's death, and to this latter my conviction inclines me.

The history of the subsequent cases will illustrate this, better perhaps than analogical reasoning, and lead us to comprehend more accurately the distinctions referred to.

The 3rd. Troop of Bombay Horse Artillery left Mhow, in Central India, *en route* to Poona, on the 29th. of March 1846, which may be said to be the commencement of the hot season. Twelve days marching, devoid of any extraordinary incident, except perfect exemption from sickness, brought them to Dhoolia, when the usual halt took place. On the following morning, the 12th. of April, it was reported, that one of the Elephants which had been considered sick, and whose load had consequently been lightened for a few days past, had died during the night.

A committee was ordered by the Commanding Officer to assemble, to ascertain and report upon the cause of death, at which I attended. The Mahout, who was questioned, said, that the animal had suffered for some days from a swelling in its throat, an affection to which Elephants were very subject, and that he had given the usual remedies, which he had purchased out of the bazar, and which were generally effective. This was all that was elicited in the shape of external evidence.

At my suggestion, deep incisions were made into the integuments of the throat, and the first remarkable and abnormal appearance, was a profuse flow of serum, and an abundant effusion of it between the interstices of all the cervical muscles, and the subcutaneous cellular tissue, which was quite distended, pulpy, and gelatinous looking; the fibres of the muscles appearing pale and softened, and as it were, macerated.

On cutting deeper, and opening the trachea, its lining membrane was found vascular, highly congested, and of a deep red colour, a band or streak of muco-purulent matter coating the posterior surface of it internally. The epiglottis and larynx, were however apparently free from any implication in this inflammatory condition. Want of the necessary implements, and the great heat of the sun, prevented me from making a more extended examination, though it was much to be desired, as the abdomen looked tense and full, and the serous membranes of both it and the thorax might have been implicated.

I was not a little astonished at the immense coagula that escaped from the large vessels of the neck, on being divided. As the blood flowed profusely, and was literally baled out of the cavity formed by the incisions, the men drew back in terror, exclaiming that worms were floating about in it, but on examination, they were merely large slippery coagula, some, six inches in length, by one and a half in diameter, tapered off to each extremity, and very firm in texture. On turning to something which attracted my attention a little distance off, I found the Sergeant Major, who was present, endeavouring to divide the ramus of the lower jaw with a hatchet, and upon his expressing a wish to have the grinders, I superintended the decapitation of the animal. I mention this, merely because it brought to our aid the Moochee, who could not be induced to touch the animal, without smearing his hands and arms with oil, assigning as his reason, the certainty of disease supervening, and *its liability to return periodically, at intervals of twelve months*. This amused the men not a little, but the laugh was eventually on the Moochee's side, for he escaped the infection, which subsequently developed itself upon the only four who were actively at work. Two of these were employed in separating

the head, and were literally up to their elbows in blood, and these suffered the least; a third for his own gratification amused himself by detaching a hind leg, while the fourth, and most severe case, was the Sergeant Major himself, who was struck by a small splinter on the cheek, while hewing at the jaw-bone. With this exception, there was no abrasion of the surface in any of the patients, so that the disease cannot but be believed as resulting from absorption through the integuments.

The character which it assumed at first, appeared to me to be purely local, while the type of the constitutional implication, which succeeded very quickly, was decidedly inflammatory, thus differing from that usually attendant on the *Pustule Maligne*, which is described "as nervous, or low typhoid in its most aggravated form," and appearing at a more advanced state of the disorder.

The first symptoms were mostly noticed on the 2nd. day, (in one patient on the first,) and commenced with a sensation in the affected parts, of being stung by an insect, accompanied with an intermitting, sharp, darting pain, like the bite of a musquito, and this could scarcely be designated precursory, for on looking at the spot which thus attracted attention, it was invariably found affected, though in different states. In one, appearing like a small bruise or pinch, where the effused blood is dark and confined, in another, hard as if a boil were about to appear, in a third, resembling hives, and in the fourth, which was more forward, like a vesicle or phlyctæna of an oval shape. But whatever may have been the first appearance, it invariably assumed that of a vesicle, on rupturing which, an ichorous watery fluid escaped, and the cuticle being removed, exposed beneath an ashy, dry, firm slough, the size of the base of the vesicle, or local irritation, also oval, and very adherent, and tenacious in its whole extent.

The margins of the sores which bounded these, were smooth, soft, and well defined, the discharge sanious and clear, but trifling, and the base, except in one instance, free from hardness or tumefaction.

The surrounding integuments were either affected with erysipelas and inflammation of the lymphatic, whose course was marked by a broad riband of angry redness up to the axilla, and neighbouring glands, or by a glassy œdema. In the latter case, effusion into the interstitial cellular tissue took place very rapidly and extensively, reaching down from the right cheek to the mammary and hypochondriac regions, and into the reticular texture of the eyelids and lips, the apertures of which, it almost totally closed, but this œdema never itself took an erysipelatous inflammation, or showed any disposition to vesicate. The sores were with one

exception, confined to the exposed parts of the superior extremities. The method of ulceration was slightly phagedenic, but not rapidly so, the sore spreading in most cases, seemingly by mere extension, as if from the ichor of its own discharge, the first slough not being detached, or any other change apparent at the next dressing beyond the enlargement of the sore, which retained its oval or circular form, though occasionally it was quite stationary. The powers of the parts in the vicinity were at all times languid, evincing no disposition to throw off the sloughs, and all differed slightly, in this respect. In the Sergeant Major's case, a cluster of shining, lustrous vesicles was thrown out, completely round the sore, almost resembling eczema, and as soon as they were broken and had discharged their contents, the subjacent parts became intensely hard and unyielding, when a successive crop of vesicles appeared further out, on the apparently sound skin. In one case, the cuticle lost its adhesion to the cutis, and the surface, instead of being sloughy, was raw and moist, like a blistered part, without feeling when touched, but afflicted with a burning pain, and in this manner did the sore spread. Another patient had sores of both the sloughing and vesicular characters, on the same fore arm, the latter of which, were by far the most difficult to deal with, from the tendency of the integuments to vesicate, while the tenacity of the sloughs of the former, prevented the beneficial application of any but the most potential remedies. So obstinate were the eschars in this respect, that the first and smallest did not begin to separate before the 8th. day, and did not do so entirely before the 15th. In the most unpromising case, the 16th. day had elapsed before I could attempt the removal of the eschar, and that was effected happily in two or three days, with the aid of the knife.

The depth to which these sloughs extended was very remarkable, a small sore on the distal extremity of the first metacarpal bone of the right hand, not a quarter of an inch in diameter, having laid bare the tendons of the *extensor communis* and *extensor indicis*, as well as the bone underneath. The cavity and form of the sore on the detachment of the slough, was always smooth and cup-shaped, as if the piece had been scooped out.

The time of the occurrence of the primary fever, was early, and simultaneous with the appearance of the primary vesicle; its character was decidedly inflammatory, though not very actively so, for the system, in local mortification does not sympathise to a very great degree. It occurred principally towards evening, or at night, and lasted five or six hours, exhibiting a remittent type, and from the condition of the system, (all the patients being plethoric,) this might have been anticipated.

It could not certainly be said to be caused by irritation, acting on a habit, or state of the constitution vitiated by disease or natural debility, as it occurred amongst the most robust men; in all probability this very plethora admitted too readily the influence of noxious matter, and thus stood in the relation of a predisposing cause. In some cases there was also a secondary fever likewise, of an inflammatory type, arising generally about the sixth day, during the height of the sympathetic irritation, but this was not very urgent.

There seemed to me to be three stages of the disease sufficiently well marked to admit of distinction. The 1st. febrile, occurring a few hours after the first perception of the local irritation, and ceasing on the rupture of the vesicles or detachment of the cuticle, occupying altogether from four, to eight or nine hours. The 2nd. more prolonged, terminating at the separation of the eschar, between the eighth and fifteenth days; in this stage, secondary fever supervened irregularly, but for the principal part of the time, the patients were free from it. The 3rd. stage was denoted by the healing up of the sores, and was still more prolonged than the preceding, nearly three weeks elapsed before the smallest filled up, with the assistance of stimulants and dietetic measures, a plenitude of which the system markedly required, from the sallow phlegmatic countenance that attended the latter stages.

Consistent with the primary and local character of the sore, (for pustule is quite an inapplicable, and far from descriptive term,) were the indications in the treatment, and after the failure of mild measures, which were tried at first, when the novelty of the disease precluded me from adopting immediately a decided course, I felt convinced, that like all phagedenic ulcers, powerful applications would alone be serviceable; on the principle of their being destructive both of the diseased surface, and the secretions of the sore, and, "by confining it to the bounds of its local cause, prevent its contaminating the system and becoming a general disorder."

With this view, I fixed upon the most powerful escharotics the pharmacopœia affords, hydrate of potass and nitric acid, reserving the latter, because the sores did not spread very rapidly, and were, with one exception, not situated in important places, or adjacent to vital organs. In trying the hydrate of potass first, I had in mind an authentic fact connected with it, viz. the celerity with which sores caused by it heal, and of which every one who has used it extensively must be cognizant, and I found it to answer my expectation fully.

My practice was as follows.—Around those sores which had a tendency to spread by successive vesications, I drew with a saturated solution of nitrate of silver, or a stick of it slightly moistened, a wall of circumvallation.

tion as it were, two inches or more from the sore, according to the distance and size of the vesicles, repeating it in a wider circle should there appear beyond it, at the next dressing, the smallest vesication. I may here incidentally remark, that in attacks of erysipelas, this is a most safe and successful practice, and if not deferred too long, will certainly arrest the extension of the cutaneous inflammation, and experience suggested it to me on the present occasion, where it proved equally beneficial.

The tendency to spread, being subdued by the use of the nitrate of silver, the hydrate of potass was applied both to the sore and the eruptions, by rubbing a stick of it, (held in cloth or a pair of forceps,) over them, several times, not hastily, but rather firmly.

The effects of this were apparent in a very few hours, in the drying up of the vesicles, in the partial detachment of the slough in sores of that character, and the bright, florid, irregular margins that were substituted for the smooth, circular, and glassy ones of the malignant pustule. The slough also, instead of being adherent and elastic, became shrivelled and contracted, exhibiting when successful, and as it progressed, the same phenomena that it does in healthy structures. Where the slough after the first application was unchanged, looked doughy and was incapable of being separated in any part of its circumference, a second touch seldom failed to produce the desired result.

The sore was afterwards treated like an ordinary ulcer, with poultices, tincture of opium being added if irritable; when there was any approach to indolence or stagnation, the application I found most appropriate, was a weak nitric acid lotion, five minims to the ounce.

In small sores, where the situation over joints contra-indicated the use of the hydrate of potass, the tardiness in healing, compared with those touched with the caustic, was quite remarkable, the difference in time, alone, independent of the position and size of the sores, being seven or eight days at least.

As connected with the hydrate of potass, it may be useful to know that weak vinegar and water applied early, will effectually and infallibly relieve the burning sensation produced by the caustic.

But in one case, this escharotic failed, owing I conceive to the excessive induration and tenacity of the original eschar, which prevented the penetration and consequent chemical alteration of it, and here, the nitric acid undiluted, applied as directed by Mr. Wellbank, with the unimportant substitution of sponge for lint, answered every purpose, but it had to be repeated several times, the previous eschar being pared with the knife before each application, as it was found impossible to detach it altogether,

as much on account of its firmness, as the active arterial hæmorrhage that arose. The blood, it may be mentioned, was particularly bright and florid.

In the relief of the attendant fever, mild antiphlogistic measures were found sufficient; a brisk purgative of the compound extract of colocynth, or compound jalap powder, and a few doses of calomel and opium, quieting all irritation of the system. This removed, the patients felt, and expressed themselves in perfect health. There was however in all, in the latter stages, a sallow phlegmatic look, indicative of constitutional impairment, and which I met with generous diet and the exhibition of beer or wine, and exercise in the open air; but still the length of time under treatment of the patients was very considerable, the most favourable case being thirty-five days, the least so forty-seven. None proved fatal, or injurious to the motion of either joints or tendons.

Next in importance to the accurate knowledge of the symptoms of a disease such as the foregoing, and a successful *methodus medendi*, is the possession of the nature of the exciting cause, and though it can be traced clearly to contamination from the blood of the Elephant, it is not so apparent, whether this state of the blood was a normal condition, and inherent property of it, or whether it was a morbid product or virus, generated in the course of the disease that destroyed the animal. The latter perhaps has the greater title to credence, for it is scarcely to be supposed, that such a remarkable disease would have escaped the notice of Sportsmen, who must have seen many Elephants partially cut up, in the extraction of their tusks and teeth, and many people handle the blood. This has more particular reference to the late writings of Col. Campbell on Ceylon, and Sir W. Harris's Wild Sports of Southern Africa, both published by men who were wont to observe accurately. Few things I regretted so much, as to have been prevented dissecting thoroughly, the Elephant that came under my inspection, for though there was evidently inflammation of the lining membrane of the trachea, and great interstitial effusion of serum external to it, among the cervical muscles, I could neither trace disease further, nor say that there might not have been some more serious implication of the vital organs, in the abdomen, or thorax, such as gangrene of the lung, which M. Dupuy affirms is productive of Malignant Pustule, in the same manner as it arose in the present instances, viz through the blood of the animal. We know that the blood is strongly impregnated with the peculiar virus developed in this disease, that the latter is communicated by contact, or inoculation, and that hitherto there has been no reason to doubt the opinion of an eminent pathologist, viz. Dr. Carswell, that, "the production of mortification from a

septic agent, generated in animals in a state of disease, (being introduced into the blood, or applied to the surface of the body or sores,) is by no means a rare occurrence," yet, it would have been satisfactory to have accounted for it from the actual detection of the cause, and I am far from satisfied of the exact nature of the disease in the Elephant from which the deleterious principle was eliminated, though I believe the disease in the human subject to be rather ascribable to this source, than to the mere properties or chemical combination of the blood itself.

In reasoning thus, I am setting aside completely the probability of the Malignant Pustule resulting from recent dissection, the freshness of the subject, or the putrefactive process, but the difference in the symptoms arising from those sources, is almost too well marked to admit of comparison or doubt.

In the 1st. instance, in Malignant Pustule, the local precedes the constitutional disturbance which is not the case in the other disease.—2nd. The fever, instead of being of an adynamic or typhoid type, is inflammatory.—3rd. The local symptoms are most frequently a vesicle, never a pustule, attended with inflammation of the lymphatics, and not diffuse inflammation of the cellular tissue.—4th. Whatever disease may have caused the animal's death, it certainly did not appear to be inflammation of a serous membrane;—and 5th. as to its being the product of putrefaction, (independent of the fact mentioned by Mr. Adam, and generally admitted, "that the most dangerous poison is destroyed by this process, and that the disease caused by inoculation with putrid matter is for the most part *mild*,") this process could scarcely have commenced, for the dissection of the animal took place six hours after death.

From these arguments therefore, in connection with the detail of the cases to which they refer, we are, I think justified in concluding that this malignant *vesicle*, as it appeared in the 3rd. Troop of H. A., was evidently attributable to the absorption of a peculiar and highly deleterious virus produced by, and conveyed through the medium of, the blood of the Elephant; and that in all likelihood, this condition of the circulating fluid, was brought about by the disease of which the animal died, and which, as far as a cursory post mortem examination displayed, was inflammation of the trachea; but, from the existence of negative proofs merely, it leaves the question "not proven," whether the blood of the Elephant in its normal state, does not possess equally injurious and destructive properties, (popular belief being for, and supposition and inference against, such an idea), or whether other diseases, to which the Elephant is subject, may not develope similarly virulent principles and effects.

These are points, which the few opportunities that occur in this part of India may prevent our deciding, but pathologists and anatomists in Europe might perhaps be better able to do so, from those which are afforded them in the dissection of Elephants which occasionally die, or are destroyed in the different menageries.

The whole history of the disease, however, its origin, progress and treatment, are not without their moral ; teaching us the necessity of caution in meddling with the remains of Elephants, at any time, particularly when they are supposed to die from swelling and enlargement in the throat.

With respect to the definition of the disease, though not desirous of adding to our almost infinite Nosological Vocabulary, or of creating names from trifling peculiarities or symptoms, the term *Malignant pustule*, is a misnomer so obviously erroneous, that, to substitute *Malignant vesicle*, seems but the dictate of common sense.

Appended are the outlines of the four cases to which I have had occasion to refer.

CASE I.—*James Christian, Gunner, 3rd Troop H. B., Age 30 Years. General conformation robust.*

April 16th, 1846. Was admitted into the hospital this evening complaining of fever, which came on at 4. P. M.; it is now present, and characterized by general inflammatory symptoms, though not in an aggravated form; heat of skin, foul tongue, quick pulse, and thirst. He shews a dry, oval, ash-coloured spot, at the junction of the first metatarsal bone and phalanx of the index finger of the right hand, and says, he noticed it on the 14th inst. at Chickeelwahul, since which, it has been pricking and stinging him a good deal, but it gives no other inconvenience. On removing the cuticle, a dirty, tenacious slough is adherent to the bottom, and all round the sides of the sore, the margins of which are pale, well defined, and free from inflammation. He was engaged in the dissection of the Elephant on the 12th inst. and cut his finger, but the cut is not affected in the least.

Liq. ammon. acet. ζ lss, Vin. antim. m. x, Spir.
æth. nit. ζ ss To be taken every second hour.
Pulv. jalap. c. ζ iss. Zinzib. gr. v. To be
taken at bed-time. Apply a poultice to the sore.

April 17th. Fever lasted nine hours, is free from it at present, and feels quite well ; medicine acted freely ; sore much in the same state.

Sod. chlor. gr. v, Aq. ζ i. To be applied to the affected part.

Vespere. Had a return of fever of the same character, occurring at the same hour; sore unaltered.

Let the lotion be continued; and repeat the diaphoretic mixture and purgative.

April 18th. Fever left at 1 A. M. enduring as yesterday, about nine hours, slept after it and is refreshed. Sore does not seem disposed either to spread, or throw off the slough; glands of the axilla affected.

Increase the Sod. chlor. to gr. x, to the ounce.

Vespere. No fever this evening, the purgative has been acting all day. Continue the lotion.

April 19th. Feels well; the stinging pain has left the sore, which is still stationary, so far as its phagedenic nature is concerned, though it appears deeper if any thing.

Increase the Sod. chlor. to \mathfrak{z} i, to the ounce.

April 20th. No recurrence of fever, or alteration in the sore. Apply a carrot-poultice.

April 22nd. There seems no change whatever, the patient is in good health and spirits, making no complaints.

Acid. nitric. m. x, Aq. font. \mathfrak{z} i. to be applied to the sore on a rag kept constantly moist with it.

April 23rd. The lotion smarted very much, but the slough is curling at one point and beginning to be detached.

Continue the lotion.

April 29th. Since last report the slough has gradually separated, the sore smarting considerably at each application of the lotion. It has left a deep cup-shaped wound with defined edges, and has exposed the tendons of the *extensor indicis* and *extensor communis*.

Lotion to be omitted and a poultice applied.

May 18. Is this day discharge cured. The tardiness of the sore in putting forth granulations and closing up, was very remarkable; it occupied 19 days. Full diet and beer were ordered, and continued since last report, and also exercise in the open air.

CASE 2.—*Thomas Lawson, Gunner, 3rd Troop H. B. Age about 32 Years. General conformation robust.*

April 16th. 1846. Was admitted this afternoon, with slight febrile symptoms, accompanied with severe headache, which came on to-day at 1 P. M. and left him at 5 P. M. Diaphoretic medicine such as that pre-

scribed for Christian (Case 1.), has been given. Is also one of the men who was dissecting the Elephant, but he busied himself with taking off a hind-leg and was not smeared with blood. The spot on him, is situated on the proximal phalanx of the index finger of the left hand, or rather over the joint between it and the medial phalanx, and appears just like a pinch or bruise, but dry; he noticed it on the 13th. inst. at Arvee, the day after the infection was taken, and felt it first as an itchy spot, as if a thorn had stuck in it; he scratched and opened it with a needle, when a clear limpid fluid escaped.

Apply a poultice to the affected part. Three cathartic pills to be taken directly.

April 17th. At one A. M. had a recurrence of fever with fainting which remained but a few hours; is quite free from it at present.

Continue poultice.

Vespere. Fever just going off, having been present since one o'clock, sore very irritable and itchy.

Calomel. gr. x, Pulv. jalap. c. 3iss. To be taken at bed-time. Let the poultice be made in decoction of opium.

April 18th. No return of fever during the night; felt relief from the opium, the dry eschar still remains fixed, itchiness has left the part, medicine acted freely.

Continue the Decoct. Opii.

April 20th. There is no change in the appearance of the sore, but a slight watery discharge from beneath it; eschar shews no sign of separating though this is the 7th day since it first commenced; seems, and feels well in other respects.

Sulph. zinc. gr. x, Aq. 3i. To be applied to the eschar. Repeat the poultice at night.

April 23rd. The Eschar has peeled off and a sore with a bright red surface is visible underneath, quite insensible, and discharging a profuse watery ichor, which, however, does not irritate the surrounding integuments.

Continue the Sol. zinc. sulph.

April 26th. No diminution of the discharge, there is slight œdema of the metatarsus with some redness and pain, and a burning heat in the sore.

Omit the Sol. zinc. sulph, and apply Sol. acid. nit. m. v, ad Aq. 3l.

April 29th. Œdema rather increased, and the angriness of the surface has a little receded, heat of sore continues, and it shews a disposition to enlarge towards the metatarsus.

Calomel. gr. v, Opii gr. ij. To be taken three times a day. Argent. Nit. to be applied outside the œdematous parts, on the sound integuments, all around. Increase the strength of the Sol. acid nitric. to m. x, to the ounce.

May 1st. Œdema has quite disappeared, but the profuse watery discharge and heat of sore continue, and it is still spreading, no implication of the constitution has occurred. With this state I would apply the undiluted nitric acid, but for the proximity of the joint, across which the eschar runs.

Hydr. Potass. to be rubbed over the sore, deeply and freely. Continue the Calomel and Opium.

May 3rd. Sore has ceased to spread, margins distinct, no discharge; slough from the Hydr. Potass. covers the whole surface. Looks sallow.

Omit the Calomel and Opium. Continue the poultice.

May 19th. Slough separated on the 4th day, after which granulations sprung up, and the sore healed rapidly. He is this day discharged cured.

CASE 3.—*George Porter, Gunner, 3rd Troop H. B. Age 24 years. General conformation robust.*

April 21st 1846. Is also one of the men who were dissecting the Elephant, and up to his elbows in blood; has delayed coming into hospital, though he has been suffering since the 14th. inst. when the first sore broke out, (two days after contact,) on the right arm, near the wrist, like a hive, which subsequently filled into a vesicle. In two days more (viz. on the 18th.), four other spots appeared on the right arm, at first vesicular, and afterwards sloughy, similar to those on Christian, but not phagedenic, or attended with inflammation, and also four spots on the left arm, of quite an opposite character, spreading as described in my report, by repeated circles of bright vesicles, resembling Eczema, accompanied with violent erysipelatous inflammation and lymphatic engagement, marked by a broad red band nearly two inches in breadth, extending up to the axilla, where the glands are felt enlarged; it is curious,

that in the midst of these, is a spot of the sloughy character. He says, he had fever on the 19th. and 20th., during the height of the inflammation of the sores.

Apply a poultice made with Decoc. Opii to the right arm; and two dozen leeches, and a wall of circumvallation of Argent. Nit. to the left arm. Cal. et Pulv. Jacobi, ää. gr. iii, Opii. gr. i. to be taken at bed-time, and a draught of senna &c. in the morning.

April 22nd. Fever has not returned, medicine acted freely, no vesicles have appeared outside the parts to which caustic has been applied, but where this has not been present, they have continued to spread.

Continue the treatment.

April 24th. Some vesicles have still appeared, but not beyond the caustic, the sloughy sores do not seem inclined to throw off their eschars, nor yet to spread far; no return of fever, glands of axilla reduced, lymphatic engagement disappeared.

Hydr. Potass. to be applied to all the sores on both arms.

April 27th. Vesicular tendency perfectly arrested, and the separation of the eschars promoted, they are curling, and leaving clean edges to the sores.

Apply a poultice.

May 18th. There has been gradual amendment since the 27th. of last month, but, as rather unusual with sloughs from the Hydrate of Potass, the sores did not heal rapidly, those which spread by crops of vesicles taking a long time to disengage sloughs; requiring to be stimulated with weak Nitric Acid. Discharged cured to-day.

CASE 4.—*Benjamin Mayes, Sergeant Major, 3rd troop H. B. Age 33 Years. General conformation very plethoric.*

April 15th 1846. Came up to me during the march this morning, and said, that he had been suffering from fever for four hours in the night; complained also of a boil coming in the right cheek, which has felt itchy and painful for the last two days, and is now hard and red.

Apply twelve leeches to the affected part. Cal. gr. v, Pulv. jalap. c. 3 lss. Pulv. aromat. gr. v. To be taken directly.

April 16th. Medicine acted freely, and fever did not recur; there is less hardness of the cheek, but the leech-bites are looking angry and swollen.

A poultice to be applied. No medicine.

April 17th. Clusters of bright shining vesicles appeared beyond the leech-bites, preceded and surrounded by thickening of the integuments. States now, that while cutting at the ramus of the lower-jaw to extract the Elephant's teeth, a small piece, or splint of the bone, flew up, and stuck in his cheek, which he immediately brushed off, and thought no more of it.

Sulph. zinc. \mathfrak{v} i. Aq. font. \mathfrak{z} iv. To be used as a lotion.

April 18th. Vesicles thrown out still further in a circular form, the hardness still preceding the vesicatory appearance. No fever.

Omit the Sulph. zinc., and apply as a lotion

Acid. nit. m. x, ad Aq. \mathfrak{z} l. Repeat the purgative of Cal. et Jalap.

April 19th. The hardness is extending, and the diameter of the parts engaged is fully three inches, reaching, from the angle of the lips, almost to the margin of the lower palpebra; there is no pain in the cheek, but a feeling of weight and perfect insensibility to the touch.

A line to be drawn round the whole circumference of the sore, on the sound integuments, with Argent. Nit., and Hydr. Potass. to be applied to the central parts.

April 20th. A very few vesicles have appeared outside the caustic, towards the temple. No effect from the Hydrate of Potass., surface excessively hard and perfectly insensible.

Dressing changed to undilute Nitric Acid, applied with a sponge, and held on, until smarting is produced; and a further and outer wall of caustic to be applied. Cal. gr. v, Opii. gr. ii.
To be taken three times a day.

April 21st. The Argent. Nit. seems to have checked the phagedenic character of the sore, but its hardness is as firm as leather, to which alone I can compare it; it bears cutting with a knife, to a slight depth only, as the arteries spout forth blood, bright and florid.

Pulv: lap. calamin. To be shaken over the vesicles.

April 23rd. Œdema of the lips and face has arisen, closing almost the apertures of the mouth, and both eyes; tonsils swelled and the throat complained of.

Touching with Nitric Acid to be continued.

Omit Cal. et Opium. Magnes. sulph. ʒi .

To be taken to morrow morning.

April 25th. Œdema extended to the right mamma. Tongue clean, appetite good, pulse rather small and quick. The Acid pains a great deal immediately after its application.

Omit the Nitric Acid, and apply Sol. sod. chlor. in a poultice.

April 28th. Has been improving since last report. Œdema has left, the vesicles have dried up, and the sore is closing into determined limits, it is quite circular, and about an inch and a half in diameter. Appetite good, feels in perfect health.

Continue Sol. sod. chlor. in poultice.

May 2nd. First able to remove a portion of slough, which was done effectually by raising it with the forceps, and clipping the part off with a pair of scissors.

Omit Sol. sod. chlor. in the poultice.

May 5th. This day detached the remainder of the slough with the knife, by separating the attachments of it; granulations underneath looking quite healthy.

Simple dressing.

May 28th. Sore filled up and closed in, only this day, (twenty three days since the slough was removed). His health has not suffered in the least. The mark left resembles that of a cicatrix of a burn.

ARTICLE VI.

Annual Report of the Tannah Civil Surgeoncy for 1846.

By J. W. Winchester, Esq. Assistant Surgeon.

 Presented May, 1847.

The Medical Charge at Tannah comprised during the past year, the Gaols, the Ghat Light Infantry, the Left Wing of the 9th Regiment N. I, the Civil establishments of the Collectorate, the Customs and the Judge's department, with a detachment of the Native Veteran Battalion at Bhewndy.

2. Of all these charges the most important have been the Gaols, which are the Fort or subsidiary Gaol, and the Town or common Gaol. The first is, properly speaking, a Gaol-depot for prisoners from other Zillahs, whilst the latter is generally filled with prisoners who are natives of the Concan. The Town or common Gaol is situated in the centre of the town of Tannah, on low ground, bounded on the east by a creek, or arm of the sea, which runs up to Colsette Bunder; this creek is dry at low water, and its soil is chiefly mud; westerly, it is entirely flanked by a large tank many thousand square feet in extent, which generally becomes dry in April and May, and at all times generates more or less foul air. The ground, unless as above described, is level and built on; the interior of the Gaol is not elevated, consequently the drainage is far from complete; walls about eighteen feet in height surround it, and the whole building forms one great square, divided into smaller and separate compartments, in each of which are prisoner's cells, cooking places, or work-shops. These cells, or lock-up-houses, run east and west; facing the north they have a built foundation of from four to six feet, and from their size and situation, have as free a ventilation as buildings surrounded by a wall, on a level surface, permit. The interior of the Gaol generally, presents a gloomy aspect, which the heavy rains of the monsoon greatly increase.

3. The Fort or subsidiary Gaol, is regularly fortified, surrounded on three sides by a broad wet ditch, and on the fourth by the Tannah creek. The walls and bastions appear of a great height from the Esplanade, but the interior is so elevated that the buildings are tolerably open to the breeze. Near the Gaol, (if the creek and a large tank nearly dry in the hot season, be excepted,) there are no causes for malaria. The cells, like those of the Town Gaol, are detached, long, tile-roofed buildings, each capable of containing from fifty to eighty prisoners. It is to be remarked, that the convicts are only shut up in them from 4. P. M., till day light the following morning; during the day, all classes of prisoners having permission to move about freely.

4. In the Fort Gaol upwards of 1,200 prisoners can be accommodated, in the Town Gaol only from 4 to 500; they however are seldom filled, and want of space is not a matter of complaint.

5. There is no hospital establishment kept in the Fort Gaol, unless during the season of epidemics; the convicts in it when sick, being sent to the hospital of the Town Gaol, where the accommodation is scanty; but when there has been more than usual sickness, the adjoining cells have been used, and the hospital not being one great building, advantage of this is taken to keep those separate who are suffering from peculiar forms of disease.

6. A system of medical inspection of the prisoners is practised, where each prisoner is individually examined, and if found unwell, either admitted on the sick-list or prescribed for. But the chief advantage derived from this inspection by the Medical Officer, is, that frequently seeing all the convicts, as once a week, he has the opportunities allowed him of checking, by change or increase of diet, that scorbutic tendency, to which the convicts in the Tannah Gaols are so predisposed.

7. The diet is fixed; those prisoners on hard labor receiving rations according to one table, and those without labor according to another. The quantity of provisions is just sufficient for one man's consumption; but when prisoners join their rations together, (a practice which prevails,) more than ample. Rice and wheat are the chief grains allowed; it is very seldom that any other is asked for, the former being universally used by inhabitants of the Concan of all castes, and the latter, by the convicts from the other Zillahs above the Syadharee Ghats. No limitation is placed to the Civil Surgeon granting an increase of diet; formerly there was a fixed table, of what was termed "Scurvy Diet," (vide Table No 1.) but so great a quantity and number of articles being beyond any one man's consumption, a system has been introduced of granting prisoners when

sick, some one or more of these articles of diet, as the case may require ; a detailed list of which is daily kept in Maratha, as well as noted in the medical diaries, so that no want of economy prevails, whilst, according to this system, at not a greater expense to the state, the Civil Surgeon allows extra diet to a greater number of unhealthy prisoners than was formerly the case.

8. As already noticed, there are two classes of prisoners, those confined with, and those without labour. The former are assorted together, according to similarity of crime, or its atrocity ; for instance, a common thief and gang-robber, are never shut up together ; they all, however, labor in company, either at the manufacture of paper, cloth, or on the roads. The hours for labor are from 8 A. M. till 3 P. M., and in no case is the labor of so severe a nature as to injure health ; frequently from a paucity of Guards, the prisoners are not all taken out to work ; and when from disease, its effects, or other infirmity, hard labor is likely to injure a prisoner's health, he is exempted from it, being put on what is called "light work," such as cleaning out the gaol, attending the sick, or the like ; if altogether incapable of labor, he is termed "unfit," and so kept, till found adequate to resume labor. A prisoner confined without labor, is supposed to do none, neither is he called on to do any. Generally, they employ themselves more or less within the gaols, but as prisoners of this class are commonly confined for short periods, it has not been remarked that their health is either better, or worse, than those on labor.

9. All the prisoners are uniformly clothed, issues of clothing being made twice a year, in May and October ; each prisoner is allowed yearly two cumblees or coarse worsted blankets, two jackets, two dhoturs or drawers of coarse dungaree cloth, and one cap. The females receive one cumblee, two sarees, and two cholees. Those who have been upwards of twelve months in gaol, have always plenty of clothing ; and if a prisoner is admitted into gaol, before the half yearly issue, he is permitted to retain his own, or part of his clothing, which, with old clothing from the stores, completely fits him out ; a want of clothes is consequently never known.

10. In concluding these general remarks on the gaol economy, it is only necessary to add, that all the prisoners on hard labor, are fettered according to their strength, their violence, or their crime, but never over so, for the Civil Surgeon's recommendation that a weak or sick prisoner should have lighter fetters, or none at all for a time, is invariably attended to. The system of provisioning is by contract ; selected prisoners

cook their rations in messes, and as they are almost daily inspected, they are mostly found good; when not so, they are returned to the Contractor. Minute sanitary rules it would be tedious to dwell on; suffice it to say, such are rigidly enforced, and as emergencies arise, the judicial authority has been more than prompt to aid the Medical Officer both in establishing new rules, and in strengthening old ones.

11. All castes of Natives on this side of India, are inmates of the Tannah Gaols; besides these, a great number of Malay and Chinese convicts, transported from the straits of Penang are included. The average number of prisoners in both Gaols during the past year, has been 1,041. There is, as has been remarked in the annual report for 1845, a source of considerable fallacy in this average, but what is more important to note, is, that an increase in the number of prisoners, is attended with increased mortality. (Vide Table No 2.)

12. This increase has been gradually taking place. Table No. 2 gives the result of full five years. To enquire further back than 1842, might confuse, yet it may not be altogether uninteresting to mention, that for 1840, the average number of prisoners was 357, the deaths 32, and for 1841 it was 271 with a mortality of 27; an increasing proportion in seven years, ascending, in round numbers, from 350 to 1,041 prisoners, with an augmenting mortality of from 32 to 271.

13. It would be leaving the statistics of medicine for those of crime, to inquire into the reasons, why the number of prisoners have thus been annually augmented; still, it is very necessary, more particularly with regard to the last three years, to offer some remarks on the class of prisoners who have been inmates of the Tannah Gaols, as from such consideration the cause of the greater mortality may be arrived at.

14. One of the chief causes of their numerical increase has arisen from drafts of convicts having been received from the Gaols of other Zillahs, as is shewn in Table No. 3. The greater assemblage of convicts in 1846, having occurred within the last two months, in order to permit of the formation of a new subsidiary Gaol at Ghat Kupper, which since the 16th ult. has been under separate medical supervision; whilst there has been a greater number sentenced to imprisonment by the local courts of this Zillah, during the last two years, owing to the late disturbances along the mountain frontier.

15. With regard to the first class of prisoners, it has been very obvious that the climate of the Concan disagrees with the great majority, and the proportional mortality among them has been very considerable; while the latter class have been chiefly from the mountain tribes, men never sub-

ject to any sort of confinement, leading wandering lives, and depending in a great measure on their skill in hunting, for their daily food. These people in great numbers, joined the gangs of the different Bandits who lately infested the neighbouring hills. Pursued by the forces of Government, they were gradually dispersed, and great numbers of them caught, tried, and sentenced to imprisonment. Before however they were caught, they were frequently driven to the utmost extremities, being "out on the hill," as they termed it, for many days, and often months, visiting by stealth their villages at night for food, and living when this was impracticable on roots and herbs; they were thus reduced to the greatest distress, excitement may have animated them, whilst they were in this manner, free, but when apprehended, they lost courage, and their minds became depressed; inmates of a gaol, they pined, became affected with the prevailing diseases, rapidly sank, and died.

16. Table No. 4, will partly illustrate the foregoing statement; and it is a remarkable fact, which much experience has tended to confirm, that women and those following sedentary occupations, are the least subject to gaol diseases. Both in the Rutnagherry and Tannah gaols, where scurvy almost always prevails, no woman has ever (though subject to the same influences, and eating a like diet with the men confined,) been attacked with scurvy. They are, moreover, seldom if ever sick. The same is the case, though less obviously so, amongst the male prisoners, who have followed trades, or who have been shop-keepers.

17. Mortality depends upon so many causes beyond human control, that the statistics of a locality present very varied results. The number of deaths registered in the British metropolis, for the quarter ending the 30th. Sept. last, above that of the corresponding quarter of 1845, shews this. Again, disorders prevalent in one year, cease to shew themselves in the next, or if they do so, exhibit a different form, ending in an unlike result. All this makes it difficult, nay even impossible to indicate more distinctly than has been already done, the remote causes of mortality in these Gaols. This has been most obviously the case with the disease scurvy, which has not been generally fatal in the Tannah Gaols till this year, when it has been unusually so, whilst fevers, dropsies, cholera, and other diseases, have been less numerous fatal. A comparative view of the mortality in fevers, diarrhoea, cholera, and scurvy, for the last four years, is given in Table No. 5. to illustrate this. The proximate causes of mortality are more specific, and have arisen from the following disorders, to which are affixed the number of deaths that have occurred from them, giving a total of 271.

Scurvy	70	Hepatitis acuta	2
Diarrhœa	60	Ophthalmia	2
Cholera spasmodica, (one } died before being treated) }	48	Cachexia (one debilitated man } died in the Fort, not admit } ted sick)	2
Fevers	20	Apoplexy	1
Dysentery	15	(was found dead)	1
Thoracic inflammation, includ- } ing Phthisis, Pneumonia &c. }	12	Anasarca	1
Rheumatism	9	Accident (crushed by the fall of } abeam)	1
Beriberi	9	Gastritis	1
Ulcers	4	Phrenitis	1
Dropsies	3	Splenitis	1
Inflammation external	3	Singultus	1
Asthma	2	Paralysis	1
Guineaworm	2		

18. The months during which the greatest mortality prevailed, were May, June, July, and August, or the monsoon months; in May and June, cholera prevailed; in May, July, and August, scorbutic complaints were most rife; in March, April, June, July, and August, diarrhœa and dysentery occurred; results which shew, that these months, have been the unhealthiest; as well as the most fatal.

19. Table No. 4, exhibits the comparative mortality of certain castes, for the whole year, corroborative of the statements made in "paras" 15 and 16. Out of the the tribes of Coolies, Thakoors, Aigrees, and Kathkarees, 90 have died, whilst the mortality in all other castes has amounted to 181. The numbers are 2,853 to 9,241, or, a per centage of 31. 70 to 42. 20; an excess of mortality of $10\frac{1}{2}$ per cent. amongst these four tribes.

20. But when the deaths of the other castes, (amongst whom disease has been most fatal,) are enumerated, the facts stated in "paras." 15 and 16 will be amply borne out. They are Marathas 31, Coombies 16, Warlees (a hill-tribe) 11, Ramoosees (robbers by profession) 10, Mahars (the village watchmen) 13, Bheels 8, Chinese 10, and Malays 10.

21. The average age of the prisoners who have died, has been 33 and a fraction, the greatest age being 80, and the least 17. Nine of the convicts received recently from other Zillahs, died within a month after their arrival at Tannah, whilst 48, including these 9, were selected and reported on, as totally unfit for labor at the New Subsidiary Gaol, either, from old age, general debility, or incurable disease. The average imprisonment undergone by the other prisoners whose cases have proved fatal, is only one year, ten months and ten days; one prisoner sentenced to confinement for life, had passed sixteen years and one month in gaol; another, fifteen years and five months, and a third prisoner only wanted fourteen days to complete a confinement of fourteen years, when he died. Thirty five prisoners died before they had been in gaol six months,

and the number of deaths among the prisoners, who were not inhabitants of the Concan Zillahs, was 88, which, deducting 10 Malays and 10 Chinese, leaves a mortality of 68, among prisoners received from other gaols besides Rutnagherry and Angria's Colabah.

22. Having thus, at very considerable length, entered into the economy and statistics of the Tannah Gaols, it becomes a matter of consideration, before concluding this portion of the annual report, whether or not any suggestions for future improvement can be offered. Situated as the Town Gaol is, long known to be unhealthy, any internal alteration could not improve what is radically bad, and it ought therefore to be abolished; the Fort converted into the common gaol of the Concan, and prisoners from above the Ghats ought never to be sent into the latter, if it could possibly be avoided; great improvements might be made within the Fort; and the chief of these would be to raise the present cells, which are almost on a level with the ground, so as to admit of free ventilation; and to build an hospital on some part of the ramparts, or convert the Gaoler's house, an upper roomed building, into an hospital. In diet, clothing, and other sanitary regulations, nothing more requires to be said; seasons and other circumstances direct these, as well as prevailing diseases.

23. The supplementary Table No. 6, exhibits the mortality, &c. from the principal diseases; to these may be added scurvy, which has been during the past year the most prevalent and fatal disease under treatment. There have been 271 cases of scurvy admitted, of these 191 have been discharged and 70 died, leaving 10 under treatment on the 1st of January. May, June, July, and August, were the months in which the greatest number of cases appeared, and this arose no doubt from the unusually heavy and unremitting rains, not only rendering the Gaols damp, but more than usually gloomy, predisposing those prisoners to whom confinement is so irksome, to this disease. The fall of rain in June was 39 inches and 61 cents., in July 57 inches and 72 cents., in August 13 inches 59 cents.

24. All prisoners are generally attacked shortly after entering these Gaols, with scorbutic symptoms. It does not require a protracted confinement to induce this disease; on the very contrary, those prisoners who have been longest resident in gaol, and whose minds and bodies have become accommodated to confinement, and a fixed diet, are the freest from scorbutic taint. Prisoners forwarded for transportation beyond the seas, and who are seldom kept in Tannah beyond one or two, or three months, almost always exhibit, shortly after their arri-

val, symptoms of scurvy ; their speedy removal, however, prevents its committing any great ravage amongst them. Such is not the case among the prisoners sentenced to limited confinement ; with them, gradually and insidiously, (often without any primary indication, as was nearly uniformly observed in those affected with beriberi,) the constitution became tainted, the face assumed a livid or leaden hue, the gums became soft, swollen, and highly vascular, the lower extremities tensely hardened, and excruciating pains were constantly experienced, difficulty of breathing ensued, the patient lost all courage, his eyesight failed from disorganization of structure, he became utterly regardless of life or death, and then rapidly sank and died. Bowel complaints supervened, and no case of scorbutic diarrhœa recovered until the month of August. Such was the common course of this disease ; but on the 8th. of that month, gangrenous ulcers began to shew themselves, first amongst the scorbutic patients, and then in those suffering from guinea worm, and sores arising from common injuries, (19 cases under the head of scurvy, and 1 under that of ulcer, proved fatal in August). The scorbutic ulcers rapidly sphacelated, and whole limbs became mortified ; so vitiated was the constitution that amputation could not be thought of. Quinine, bark, port wine, arrack or arrack punch, camphor, animonia, and in fact all sorts of medicines, with the most liberal and varied diet, failed to arrest this frightful disorder. It was only as the season became more open, that these ulcers became less virulent, and less numerous. The tendency still continues, but with diminished malignity, for there were 19 cases of ulcer in hospital, on the 1st. of January.

25. The treatment of scurvy ought to be chiefly preventive, and hence the great advantage of frequent and minute medical inspections ; for in all recent and trifling cases, changes of diet or extra diet, bark and nitric acid, and limes and sugar for sherbet, effect a cure. But when, as during the past year, the system became thoroughly vitiated in a few days, and the constitution fairly overpowered, such measures were comparatively of little benefit. Leeches and scarification were required to relieve the pain, tenseness, and heat of the limbs ; vinegar lotions, poultices formed of the pulla leaf (*Vitex negundo*, called in Maratha “Ningree,”) and liniments, were used internally. Quinine, acids, bark, and wine, iodide of iron, mustard in dram doses, nitre, and many other remedies were prescribed, with arrack, either in punch or combined with the bitter infusion of creyat, and whatever extra diet a prisoner desired, or could consume, were freely given ; with how little success, the great mortality shews.

26. The next most fatal disease has been diarrhœa including dysentery, the mortality from which has been 74, but then, these two disorders, are the common fatal terminations of all gaol complaints. Weakened, emaciated, and cachectic prisoners, used to be seized with purging ; almost every variety of treatment had recourse to failing to produce any benefit. The great majority of the prisoners when thus attacked, despaired, their constant cry was for opium, and their answer to questions as to their state was, *langootee chooran dilha*, which meant that the purging was so constant they could not wear their clothes. Of the greatest number of fatal cases, 8 occurred in June, 14 in July, and 19 in August, during the first of which months cholera prevailed, so that it is not perhaps speculative to say, that with the causes of this epidemic, may have originated in a great measure these bowel diseases.

27. The first case of cholera occurred in May, in the Town Gaol ; after a time it broke out in the Fort, and before the middle of June this scourge had disappeared. Forty eight cases proved fatal out of 122 attacked ; considering that the sufferers were prisoners, this mortality cannot be called great. In regard to treatment, there is nothing new to remark, unless that, at the commencement of the epidemic, in the Town Gaol, blood letting was adopted, and almost every case recovered ; with the same treatment in the Fort Gaol, at first, the cases were uniformly fatal. After a time, the majority of those attacked, recovered, and as the disease yielded to treatment within the Fort, so did it not in the Town Gaol.

28. These remarks might be extended to a much greater length, were the other diseases dwelt on, which is unnecessary, as nothing new can be written regarding them, beyond that their characteristics differed from the same diseases out of gaol, in the symptoms being always more or less, marked, and the disorders being proportionably oftener fatal than the symptoms prognosticated.

29. In conclusion, with a sick list of 57 patients, 87 unfits including 48 lately received from other Zillahs, and 10 men on light work from various causes, amongst 632 prisoners, little hope of a lessened mortality can be looked for during the present, than in former years ; unless the seasons are more favorable, and the less crowded state of the Gaols, (which will exist up till June, when the Ghat Kupper Subsidiary Gaol will again be joined to this,) tend to strengthen the health of the convicts.

30. The Ghat Light Infantry, and the establishment of Civil Peons are included in the same returns. The strength of the former has been 852, and of the latter 545, making a total of 1,395, of whom 477 have

come under medical treatment during the past year, 11 out of which number have died. The following have been their prevailing diseases : Fevers, admitted 211, discharged 200, died 2, remaining 9. Guinea-worm, admitted 111, discharged 106, remaining 5. Diarrhœa, admitted 21, discharged 21. Cholera admitted 17, discharged 8, died 9. Excepting therefore Cholera, only two patients treated have died, one in January, and one in March, both of fever. The annual report for 1845 out of a strength of 1,238, gives 696 admissions, of whom 629 were discharged, 48 died, and 19 remained.

31. In the Left Wing of the 9th Regiment N. I. which has been stationed at Tannah since the 29th of January 1845, out of an average strength of 522, there have been 820 men admitted into hospital ; of these 797 have been discharged, 5 have died, and 18 were transferred sick to the Head-Quarters of the Regiment on the 31st December, 1846. The deaths were 2 of Cholera, out of 11 cases treated ; 1 from Remittent Fever, out of 6 cases treated ; 1 from Jaundice, and 1 from Anasarca ; the latter a Bheestee, worn out by the abuse of ganja and opium. Of 292 cases of Intermittent Fever which were admitted, only one case remained under treatment ; of 47 cases of Diarrhœa, all terminated successfully ; of 21 cases of Guineaworm, all were cured except two, who remained in hospital on the 31st December ; and of 70 cases of Rheumatism, 68 were discharged cured, and 2 remained under treatment.

32. The strength of the Detachment of the Native Veteran Battalieu at Bhewndy is 377, and during the year 210 cases have been treated in hospital, 192 of whom have been discharged and 11 died, leaving 7 sick on the 1st January 1847. The deaths that have occurred have been from Asthma 4, Dysentery 2, Remittent Fever 2, Cholera 1, Diarrhœa 1, and Colica 1. The number of cases of Fever have been 49, of which 2 died, 44 have been cured, whilst 3 remain sick ; there have been 6 cases of Diarrhœa treated, 5 were cured, and 1 died ; 24 cases of Guineaworm have been treated successfully and 86 cases of Rheumatism, and none remained sick on the 1st January.

33. The abstract consequently is, that out of an annual strength of 2,294, with 1,516 admissions into hospital, 27 deaths have occurred including cholera, or excluding cholera 15.

34. When hospital treatment has been thus successful, it will be presumed that the treatment adopted has been what the various disorders have called for ; and the Writer's practice has for so many years been detailed in different "Annual Reports," that he trusts the above results are

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all that are now required of him, the more prominent portion of the report having occupied so much space.

Tannah, 15th January 1847.

TABLE No. 1.

Criminal Gaol Diet Table and Scurvy Diet.

GAOL DIET.											
Full Gaol Diet.				Low Gaol Diet, for prisoners without labor.				Scurvy Diet.			
	lbs.	oz.	dr.		lbs.	oz.	dr.		lbs.	z.	
Rice	1	8	0	Rice	1	3	0	1 Rice	1	0	
Dhall	0	4	0	Dhal	0	3	0	2 Mutton	0	12	
Vegetables	0	4	0	Vegetables	0	4	0	3 Dhall	0	6	
Curry stuff	0	0	4	Curry stuff	0	0	4	4 Vegetables	0	12	
Fire-wood	2	0	0	Fire-wood	2	0	0	5 Dhie Butter-milk	0	8	
Salt	0	0	4 $\frac{3}{4}$	Salt	0	0	4 $\frac{3}{4}$	6 Ghee	0	1	
								7 Plantains	No	4	
								8 Spices	0	$\frac{1}{2}$	
								9 Sugar	0	3	
								10 Limes	No	3	
								11 Salt	0	$\frac{3}{4}$	
								12 Fire-wood	2	12	

TABLE No. 2.

Table shewing the mortality in the Criminal Gaols during the last five years.

Years.	Average daily number of prisoners.	Total number of cases under treatment during the year.	Average daily number of sick for the year.	Per cent. proportion of average daily number of sick with number of prisoners.	Total deaths.	Ditto excluding cholera.	Per cent. proportion of deaths to the average daily number of prisoners.	Ditto per cent. excluding cholera.
1842	436	377	21	4.8	63	36	14.45	8.26
1843	991	1060	53	5.8	92	80	9.28	8.07
1844	1054	1070	48	4.6	97	49	9.20	4.65
1845	1224	1611	70	5.7	266	179	21.7	14.6
1846	1041	1155	63	6.05	267	220	25.6	21.1

TABLE No. 4.

Comparative mortality of certain castes in the Criminal Gaols, Tannah, during the year 1846.

Months.	Number of Coolies in both Gaols.		Number of Thakooris in both Gaols.		Number of Aigrees in both Gaols.		Number of Katharees in both Gaols.		Other Castes.		Grand Total.	
	Total.	Died.	Total.	Died.	Total.	Died.	Total.	Died.	Total.	Died.	Total.	Died.
January	69	2	19	0	36	0	60	1	1,035	3	1,219	6
February	100	0	25	0	47	0	71	1	896	9	1,139	10
March	98	0	30	0	45	1	96	3	832	14	1,101	18
April	126	5	33	0	39	0	72	1	779	19	1,049	25
May	134	11	24	4	42	0	70	5	783	28	1,053	48
June	127	5	23	3	53	1	81	2	728	29	1,012	40
July	116	7	19	2	36	0	87	5	698	25	956	39
August	121	11	18	2	36	5	66	3	701	21	942	42
September	94	1	18	0	26	1	57	1	741	9	936	12
October	87	1	18	1	38	1	66	0	699	10	908	13
November	84	2	14	0	29	0	76	0	940	4	1,143	6
December	118	2	14	0	35	0	65	0	409	10	641	12
Total.	1,274	47	255	12	462	9	867	22	9,241	181	12,219	272

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TABLE No. 3.

Table exhibiting the number of Convicts received into the Tannah Gaols from other Zillahs than the North Concan.

Names of Zillahs or places.	1843	1844	1845	1846
The Chimboor Subsidiary Gaol	644	0	0	0
Rutnagherry	5	2	223	52
Rajcote	0	0	0	1
Bombay	2	0	0	0
Pallunpoor	0	0	0	1
Alibagh	8	0	0	0
Surat	9	20	1	59
Ahmedabad	18	3	5	3
Poonah	8	8	35	163
Dharwar	12	15	9	0
Dhoolia	6	7	9	217
Malcolm Peth	12	0	0	0
Ahmednuggur	2	100	106	209
Sholapoor	16	0	11	62
Singapoor	50	81	38	29
Kattywar	0	2	2	0
Kolapoor	0	0	15	2
Sawant Waree	0	0	2	0
Maligaum	0	0	0	30
Total	792	238	456	828

TABLE No. 5.

Table exhibiting the mortality in certain Diseases during the last four years.

CHOLERA.					DIARRHŒA.				
Years.	Number of cases admitted.	Discharged.	Died.	Remain- ing.	Years.	Number of cases admitted.	Discharged.	Died.	Remain- ing.
1843	27	15	12	0	1843	78	58	15	5
1844	133	85	48	0	1844	120	93	15	12
1845	184	97	87	0	1845	213	149	60	4
1846	126	79	47	0	1846	138	76	60	2
FEVERS.					SCURVY.				
Years.	Number of cases admitted.	Discharged.	Died.	Remain- ing.	Years.	Number of cases admitted.	Discharged.	Died.	Remain- ing.
1843	182	164	12	6	1843	298	270	15	13
1844	271	255	7	9	1844	143	139	3	1
1845	453	383	55	15	1845	186	180	4	2
1846	178	155	20	3	1846	271	191	70	10

TABLE No. 6.

*Supplementary Table of the Annual Report of the Criminal Gaol
Hospital of Tannah for 1846.*

Diseases.	Number admitted during the year.	Dischar- ged.	Died.	Remai- ning.	Average age of patient.	Average number of days under treatment.
Cholera.	121	74	47	0	31	5
Diarrhœa.	134	72	60	2	32	13
Dysentery	28	13	14	1	29	10
Fevers	164	141	20	3	31	12
Hepatitis	6	4	2	0	34	18

ARTICLE VII.

Beriberi among the Marines of the Indian Navy, on board the H. C. Surveying Vessels "Palinurus" and "Nurbudda," between November 1844 and June 1846. By H. J. Carter, Esq. Assistant Surgeon.

Presented July, 1847.

The Marines of the Indian Navy are recruited from the inhabitants of the Konkan, and on arriving at Bombay, join the Marine Battalion, where they are carefully drilled previous to serving on board the H. C. Vessels.

Their mortality from the disease called Beriberi, though not uncommon in ships engaged on ordinary duty, has become almost proverbially so on surveying expeditions. There is hardly a Commanding Officer in the Indian Navy, who has not a history to give of the frightful mortality which it has frequently occasioned among this class of men, while cruising in the Persian Gulf, the Red Sea, or during the surveys instituted by the Honorable Company, of the coasts of Africa, Arabia, and the islands of the Indian Ocean.

Between the months of November 1844, and June 1845, the H. C. Surveying Brig "Palinurus," and her tender the "Nurbudda" Cutter, were employed in surveying parts of the southeast coast of Arabia, between *Ras al Had* and *Cape Aden*, and during that time, they returned once to Bombay, which occurrence serves to divide the survey into two distinct voyages.

The first voyage occupied a period of 7 months and 21 days ; the second, one of 8 months and 27 days ; with an interval of 2 months and 8 days, which were spent in Bombay during the rainy monsoon of 1845.

First Voyage.

When the H. C. Surveying Brig "Palinurus" left Bombay, on the 24th November 1844, she, as well as her tender the "Nurbudda" Cutter, had their full complements of Marines, (the former ten, the latter five,) who were all in good health.

During the voyage, their employment was not laborious, though they had much more to do in the "Palinurus" than they would have had to do on board a vessel engaged on ordinary duty, and even on board the "Palinurus," they were only called upon to work, when they would otherwise have been lounging on the deck. Their rations consisted of rice, dhal, and ghee; dried salt-fish, (chiefly mullet,) and curry-spices; (as much, or more perhaps than they would get on shore,) and fresh meat, or fresh fish whenever it could be obtained. They had their regular watches, and a part of the lower deck exclusively allotted to them for their chests, their accoutrements, and their sleeping births; so that their condition on boardship, was not inferior to that of any other part of the crew.

Up to the time of arriving off *Ras Fartak*, on the southeast coast of Arabia, the Marines had shewn no symptoms of disease whatever; one of them, however, about this time, viz. during the 1st week in March, (the 14th after leaving Bombay,) was reported sick, and unfit for duty, from a weakness and slightly œdematous state of the lower extremities, chiefly about the ancles, which, subsequently, was attended with shortness of breath on the least exertion, impaired appetite, and great disinclination to move. Between this time and our arrival at Aden, in the beginning of April 1845, all, except three, (the naigue and two privates,) became affected with the same symptoms; two died, and the rest were disabled for duty; it was therefore thought advisable to pitch a tent for them as soon as possible on shore, that they might have every opportunity of recovering their health before the "Palinurus" and her "Tender" were again ready for sea. On the 13th of April, when we were about to leave Aden, most of the Marines had sufficiently recovered to return to their duty, but there still remained two men, who were so ill that it was absolutely necessary to leave them behind; these were therefore transferred to the H. C. Block Ship, "Charger," and from that vessel we received two other healthy Marines in return, and two also in place of those who had died before we arrived at Aden; the fate of the two left behind I have not been able to ascertain.

The disease from which they were suffering, was Beriberi.—It came

on with a painful sense of numbness, weight, and a want of power in the lower extremities, followed by œdematous swelling about the ancles and shins, which, partially subsiding in this region, re-appeared after a variable interval of time over the chest; shortness of breath and turgidity of the countenance succeeded, the patient complained of a burning sensation at the pit of the stomach with much thirst; as the disease progressed, the œdema over the chest frequently disappeared, while the dyspnœa increasing, amounted almost to suffocation; there was lividity of the lips and countenance, violent urging and vomiting of the contents of the stomach mixed with blood, followed by delirium, insensibility, and death. Accompanying these symptoms, there was apparently little disorder of the secreting organs, or derangement of the intestinal functions. The countenance was slightly puffy and leucophlegmatic from the first, the tongue more or less coated, white, but not dry, and the pulse for the most part weak and quick; at first the appetite did not suffer, but later in the disease it became impaired and failed entirely; while thirst gradually increased from the commencement, so that it became necessary to order an extra quantity of water to be issued, "for the use of those affected with Beriberi." Sometimes the complaint terminated in death a few days after its appearance, as in the first fatal case; at others, the patient recovered from nearly all his œdematous symptoms, and was able to return to his duty, but, suddenly the shortness of breath would return, turgidity of the countenance quickly followed, a rapid secretion of fluid took place into the cavities of the chest, producing hydrothorax, of which the patient frequently died in twenty four hours after the recurrence of the dyspnœa. So constantly did the symptoms of the disease disappear altogether, and re-appear at intervals of uncertain duration, that I feel convinced, if a native Marine be once affected, he will, if he remain at sea eventually die of it, and that indeed, at a short warning, and at a time when the return of the disease is least expected.

For the treatment of Beriberi nothing specific has been laid down, but whatever has been recommended was then had recourse to; the symptoms were treated according to their indications, and every thing adopted, that, on the occasion, was thought advisable and was within reach. Antiphlogistic treatment, counter-irritants, alterative, tonic and stimulant medicines, were all successively employed; the usual remedies for dispelling the œdema of dropsy were administered. Diets of European rations with fresh meat and vegetables when they could be procured;—biscuit, flour, sugar, plums, and arrack, were ordered. Exer-

cise was recommended, and sometimes enforced ; but nothing appeared, either much to alleviate the sufferings of the patients, to render them any permanent benefit, or to retard the fatal termination of the complaint.

Out of 19 Marines who served on board the "Palinurus" and "Nurbudda" during the first voyage, 7 died, and I feel assured that the two who were placed on board the "Charger" at Aden, must have shared the same fate, which would make the total number of deaths amount to 9, all of whom died of Beriberi. Four were placed on board the "Nurbudda" dangerously ill from the same disease on the 9th. of May when that vessel left us for Bombay, and on her arrival were immediately transferred to the shore ; while, instead of the Brig's complement, viz. 10 Marines, only one naique and five privates were left behind, four of whom afterwards fell sick from Beriberi, and were incapable of performing any duty, but lived to be discharged to the shore at Bombay, when the "Palinurus" arrived there on the 21st of June 1846.

Interval between the Voyages passed at Bombay.

On our arrival at Bombay, the "Nurbudda" was laid up, and the "Palinurus" remaining in commission, received a new detachment of Marines, consisting of her usual complement. These men were more or less sickly during the rainy monsoon, from fevers and colds, (but not from Beriberi,) and were nearly all transferred to the shore, when the "Palinurus" was again got ready for sea.

Second Voyage.

Having transferred seven of the detachment of Marines just mentioned to the shore, and received seven other healthy ones in return, with five for the "Nurbudda," we left Bombay on the 23d September, 1845.

The Marines were then all healthy, and in other respects their condition did not differ from that mentioned in the first voyage.

It was not until the end of February 1846, after we had been at sea nearly 22 weeks, that any symptoms of disease worthy of notice appeared amongst them ; when some began to look puffy and leucophlegmatic about the face, to evince a sluggishness and a want of capacity in the proper performance of their duty, and to complain of weakness and swelling of the lower extremities, particularly about the ancles.—In these symptoms I immediately recognized the commencement of Beriberi,

so prevalent among the same class of men during the last voyage, and now resolved to adopt a treatment of regimen and hygiene, which the experience of others and a better acquaintance with the disease on my own part had suggested to me; and to have as little recourse to medicine, as was consistent with the state of the symptoms of the patient. We had for this voyage, with the exception of the Marines and native servants, an entire European crew.

On the first appearance of the symptoms mentioned, the patients were put on European rations of biscuit, flour,* plums, sugar, tea, &c. *without* arrack; and they were ordered to wear warm clothing, and to sleep in their cloaks at night when on deck.† Their allowances of rice‡ and dried salt-fish were withdrawn, and they were forbidden from messing with the other Marines, that they might have no opportunity of making use of these articles of food, in addition to what was issued to them; at the same time, they were allowed to draw their ghee. Under this dietetic and hygienic treatment, which, while it had the advantage of change of food, also enforced much abstinence,§ (for it should be remembered, that with their European rations, the Marines from their religious prejudices, could not also take advantage of the issue of the salt meat,) I began to entertain hopes that, I had successfully treated their complaint; for indeed those who were first attacked, speedily recovered from their symptoms of Beriberi, which, unfortunately however, only disappeared for a short time, to be followed by others of Scurvy.

With the prospect of this disease breaking out among them, the survey of the Island of Maseera being completed, and our stock of salt provisions for the European Crew nearly exhausted, Captain Sanders, then commanding the "Palinurus," determined to leave the coast, for Aden, where we arrived about the middle of March. Here, the Marines had double allowances of vegetables issued to them, as soon as they could be procured, with fresh meat and as many limes as they could make use of, and their symptoms of Scurvy for the most part began rapidly to disappear. Still, however, towards the end of March, when the "Pali-

* Malcolmson's Essay, on Beriberi. p. 49. "Injunction of the native practitioners.

† Idem p. 40. Beriberi "ascribed to exposure at night in the open air to moist cold winds."

‡ Idem p. 49. Native practice,—to restrict the patient to a wheaten diet.

§ Idem p. 44. Mr Cohoun's remarks on its utility in the treatment of Beriberi.

nurus" and her "Tender," were again ready for sea, there remained three men, who were so ill, that it was thought advisable to transfer them to the Honorable Company's Steam-frigate "Auckland," and to take three of her healthy Marines in their stead. This was effected, and we left Aden to return to the survey of the Bay of Al Kammar, where we arrived on the first of May, 1846. We had however not been long at sea, after leaving Aden, before one of the Marines on board the "Palinurus" was attacked with symptoms of Beriberi, and died of that disease on the 23rd of April. Subsequently, symptoms of Beriberi re-appeared also suddenly, in two Marines on board the "Nurbudda," who died of it after a few days illness, on the 25th of May; while those of Scurvy also redeveloped themselves among the remaining Marines in both vessels, so that it was thought advisable on the 29th of May, when the "Nurbudda" left us for Bombay, to transfer our worst case to her, in addition to her own complement (reduced by the deaths mentioned to three), who also were all severely afflicted with the same disease.

The mortality therefore during the second, was not so great among the Marines as during the first voyage, and those who died, (with the exception of the three who were transferred to the "Auckland," whose fate I have not been able to ascertain,) did not die until the two last months of the survey, that is, nearly nine months after they had left Bombay. In all, there were three casualties among the Marines, all of which were from Beriberi; one died on board the "Palinurus," on the 23rd of April, and two on board the "Nurbudda," on the 25th of May, 1846.

In the 1st. *Voyage*, it will be observed, that the symptoms of Beriberi began to appear among the Marines, on the 14th. week after we had left Bombay, and that nearly the whole complement was disabled for duty during the greater part of the voyage. Out of 19 Marines, 7 died at sea, 2 were left at Aden, 4 were sent to Bombay dangerously ill in the "Nurbudda," and 4 out of 6, were discharged to the shore in the last stage of the disease when the "Palinurus" returned to Bombay. Thus, out of the nineteen, 7 died, and 10 were discharged to the shore not expected to live; assuming therefore that they also died, which is but too probable, 2 only escaped the disease,—the Naique and 1 Private.

During the interval between the voyages, consisting of three months spent at Bombay, the Marines merely suffered from slight colds and fevers, incident to them at that season of the year.

In the 2nd. *Voyage*, the symptoms of Beriberi (which did not begin to

appear until the 22nd week after leaving Bombay,) at first gave way to those of Scurvy, then re-appeared after leaving Aden, when still more severe symptoms of Scurvy again followed them. Out of 18 Marines, 3 died of Beriberi, 3 were left at Aden suffering from Scurvy, 4 were put on shore in Bombay from the "Nurbudda" suffering from that disease, and of the 8 who returned in the *Palinurus*, the greater part of them also were affected with Scurvy. Thus, 3 died, and nearly all the rest were discharged from the ship unfit for duty, and more or less affected with the worst symptoms of Scurvy.

In the 1st voyage, not a single European died, and all returned to Bombay healthy; while, among the Lascars (51 in number,) the prevalence of Beriberi was proportionally as great as among the Marines, and their amount of mortality about one third less. In the 2nd voyage, with almost an entire European Crew, only one European died, (of Chronic Dysentery, a disease which the patient had contracted long before he entered the service,) while all the others, excepting the Marines, returned to Bombay healthy and strong.

Of the *exciting cause* of Beriberi I am entirely ignorant. The late and much lamented Mr. Malcolmson, in his "Practical Essay on the History and Treatment of Beriberi,"—writes, "Laennec observes that there are few diseases of which the cause is known, and of these Beriberi is assuredly not one."*—On first becoming acquainted with the disease, I successively attributed its origin to a want of vegetable food,—to a want of fresh meat,—to a want of a sufficiently nutritious diet. My opinion in the first instance altered, when I became aware, that at Aden, where the Marines get a tolerably good supply of vegetables, they become affected with it. I could no longer entertain the idea that it was from a want of fresh animal food, when informed by Captain Sanders, then commanding the "*Palinurus*," that, during the survey of the Island of Socotra, sheep were so cheap that the whole crew were daily feasting off them, and yet there was an unusual mortality among the Marines from the disease called Beriberi. Nor will the following case of a Lascar allow me to attribute the cause to a want of sufficient nutriment.

Here, I may mention, that, during the first voyage, we had half a native crew, and that, the prevalence of Beriberi amongst them, was proportionally as great as amongst the Marines, while the amount of mortality was as 2 of the former to 3 of the latter. The following is the case to which I have alluded.

Dinah, a Lascar, about 20 years of age, struck the skin off his heel at Aden on the 13th. of March 1845, when the wound, instead of healing, ulcerated; he had at the time of his admission no symptoms of Beriberi, nor had ever before been in the sick report. After a short time, the wound, which increased in size, began to assume the form of a cup-like excavation, and in a fortnight after we had left Aden, the circumference of it exceeded that of a rupee. It was now evident that the patient required a better diet, and he was accordingly ordered European rations and arrack, with double allowances of flour, sugar, and fresh meat; and treated with tonic medicines. Under this tonic and dietetic treatment, the ulcer changed in appearance, its surface became red, it threw out healthy granulations, all sloughiness disappeared, and rapidly filling up, it eventually healed over. At the time that the state of his ulcer, (not more so than his general appearance,) indicated decided improvement in his constitution, œdema of the lower extremities came on, followed by shortness of breath, and he remained in the sick list, suffering more or less from these symptoms, from the time of their first appearance, up to the 19th. of June, when we arrived in Bombay.* The disease by this time had gone through its usual stages, the swelling of the extremities had nearly disappeared, œdema of the chest had supervened, with turgidity and lividity of the countenance, effusion was taking place into the cavities of the pleuræ, the man was hurried off to the shore, and died in the Jamsetjee Jeejeebhoy Hospital.

In this instance, Beriberi did not shew itself when the powers of vitality were in a reduced state,—when, the constitution was evidently suffering from want of nutriment, but came on at the healing of the ulcer, some time after the body had regained sufficient strength to enable it to repair the injury it had sustained, and was in a condition opposed to that anæmatous appearance presented by the patient on his admission. Want of sufficient nutriment therefore, however much in the first instance it might have predisposed to the disease, could not latterly, have been considered the cause of it. Under what circumstances it makes its appearance among Indians who have never encountered a sea-voyage, I am ignorant, having myself never witnessed a case of Beriberi in any but sea-faring men of the coloured races. I should not, however, be surprised, to see it established, that the same causes produce the disease on shore, as at sea, and, that the mere fact of being at sea, told for nothing more than that the same causes were more commonly met

* Vide Malcolmson's Essay p. 49, for a similar remark.

with on board ship, during a long voyage, than under any other circumstances. With respect to the opinion that Beriberi is most common among those whose bodies have been exposed to cold winds,* (not moist†) it may be remarked, that, though the first symptoms of Beriberi in the 2nd., began to appear 8 weeks later than they did in the 1st. voyage, yet, that, in both voyages, they began to manifest themselves towards the end of the cold season, viz. during the first week of March in the 1st, and during the last week in February in the 2nd. voyage. Now, during the 1st. voyage we were seldom more than a week without a cold, dry, furious land-wind, (called by the Arabs *bolaat*,) with the first gust of which, (for it comes on suddenly when the sky is most clear and cloudless) the mercury invariably fell 10° or 11° ; so that, during the months of December, January, and February, when the common temperature was 74° Fahr. it would descend to 62° or 63° and continue there while this wind lasted; while, during the last voyage, we did not experience one of these *bolaats*, or any sudden variations in the temperature of the atmosphere, until we left the Island of Maseera. In the 2nd. voyage again, we scarcely had any fresh meat, from the time of our leaving Bombay, (Muscat excepted,) until we reached Aden; while, during the 1st. voyage, we were seldom more than a week without fresh beef or mutton. If therefore, sudden reductions of the temperature of the air, (i. e. cold winds,) and excess of nutriment, ‡ produce Beriberi, we had the former, and an opportunity of exceeding in the latter during the first voyage, with Beriberi; and neither during the second voyage, with comparatively little Beriberi, but with the presence of Scurvy, which seems to be so little allied to Beriberi that the two diseases do not appear to occur in the body at the same time, nor would they appear to be developed under the same circumstances.§

Whether the disease arises from the skin being constantly checked, in the performance of its functions; an excess of nutriment, or a want of it, from deficiency in supplies or amount of nutritive matter; the subsisting for a long time on a particular diet, or the absence of par-

* Good's Study of Med. Vol. iii. p. 352; Malcolmson's Essay loc. cit.

† We were without rain during both voyages until the month of May, and with no dampness whatever until the middle of February, when the season on the southeastern coast of Arabia appears to change, by the sky becoming suddenly clouded, the atmosphere warmer and more humid, and the falling of heavy dews.

‡ Malcolmson's Essay loc. cit.

§ Idem. p. 49 and foot-note.

ticular articles of food, or any one or more of these circumstances combined, the shortness of my experience does not enable me to determine. I have shewn that I have seen many cases of Beriberi, but they have not been witnessed under circumstances sufficiently varied to justify my drawing from them any general conclusions respecting the exciting cause of the disease. All that appears to me certain on the subject, is, that it may be, (as in the "Palinurus,") contracted at sea, and that it will prove fatal to all who are affected with it, if they are not transferred to the shore; for, out of more than fifty cases, there was not a single one, in which the leucophlegmatic countenance and œdema about the ancles ever entirely disappeared, after these symptoms had once been observed; even during the intervals in which the patients themselves felt well enough to return to their duty, and often before being reported sick, they bore a suspicious cast of countenance, which marked them out among the rest, as affected with a disease, from which it soon became the general impression of the crew that no one ever recovered.

That Beriberi may be contracted at sea, I would insist upon from the following facts, viz. The long interval of time that elapsed between the departure of the Marines from Bombay and the appearance of any disease among them; the first symptoms of ill health being those of Beriberi; the improvement which took place in their health when allowed to live on shore at Aden, and their symptoms of Beriberi returning after they rejoined the ship; the rate of mortality from Beriberi among this class of men, being greater on board vessels engaged in long voyages, as on surveying expeditions, or cruizing in the Persian Gulf, &c. than in ships employed on ordinary duty, and a short time at sea;—in ships a short time at sea, than in the Marine Battalion at Bombay.

I regret that the smallness of the vessel, and the want of a convenient place to deposit the bodies after death, prevented me from making more than one *post mortem* examination of those who had died from Beriberi; this was performed on the body of a Malay, in which I found nearly all that I had anticipated.—The substance of the lungs was certainly less œdematous than was expected, but the cavities of the pleuræ were distended to their utmost with serous fluid; the pericardium was also distended, while the effusion into the peritonæum was comparatively trifling. All the visceral organs, with the exception of the stomach, (the mucous membrane of which bore signs of inflammatory action and great vascular congestion,) appeared perfectly healthy. I could not examine the head.

In the treatment of Beriberi, I found that bleeding and powerful pur-

gatives, indeed depletion generally, and particularly mercurializing, only aggravated the symptoms; while tonics, such as quinine, appeared to afford relief, but not of long continuance. The occurrence of paroxysms of intermittent fever during the course of the disease, in some cases, produced great effect in ameliorating the state of the patient, but this also only lasted a short time, and after the symptoms of Beriberi once returned, fever never again made its appearance.

In the 2nd voyage, the treatment which has already been detailed, consisted in diminishing the quantity of nutriment, changing its nature, suspending the use of rice and salt-fish, and enforcing that of warm clothing. I was induced to diminish the quantity of nutriment from having heard that excess in food was productive of the disease, * and it seemed probable that the rations of the Marines at sea, enabled them to consume much more than they were in the habit of allowing themselves on shore; to give them a greater variety of food with wheaten flour instead of rice was the next step, and lastly, to protect the surface of their bodies against the vicissitudes of temperature, (occurring in a climate to which they were unaccustomed,) they were ordered to wear woollen clothes. Exercise, which has been recommended, † was not enjoined, for these reasons, viz., that during the first voyage it was tried without success, and the Lascars who had abundance of it, suffered as much from Beriberi as the Marines. In the first voyage, the Marines, painful as it was to them, were willingly marched up and down the deck for an hour or two daily, hoping that the exercise of drill and carrying their knapsacks would avert the fatal tendency of their complaint; but one after another gave up;—the labour and pain attending the least exertion to move, drove them to seek for ease and repose in a recumbent posture, where they immediately assumed the despondency and indifference common to the disease; while the Lascars, who were out in the boats all day, rowing or otherwise working, from dawn to dark night, began to be affected with the symptoms of Beriberi at the same time as the Marines, and suffered equally as much from it.

The system of treatment then, pursued in the 2nd voyage, was partly of abstinence, and partly for preserving a constant moisture on the surface of the body, by protecting the skin against the influence of atmospheric changes;—two essentials for relieving the body when suffering from plethora or an excess of nutriment, but in long voyages none more likely to produce Scurvy. Thus, although it would appear

* See also Malcolmson's Essay loc. cit. † Malcolmson's Essay, foot-note p. 49.

that the symptoms of Beriberi gave way to the dietetic and gentle medicinal means employed in the 2nd voyage, yet, in its place, Scurvy prevailed, rendering the Marines just as unfit for duty as the symptoms of Beriberi; nothing more therefore was gained from them in point of servitude by this treatment, however much it might have contributed to the preservation of their lives, by having tended to induce a disease less speedily fatal to them than Beriberi, and more easily cured when they reached the shore.—It therefore may be justly inferred, so far as regards both the interest of the Honorable Company and that of its Marines, that, if the latter are so prone to become affected with Beriberi or Scurvy, during a surveying expedition, or a long voyage, as to die, or become permanently disabled for the performance of their duty at sea, within the fourth or fifth month after they have left port,—it would be desirable for all parties, that they never again should be employed on such occasions.

In conclusion, I would remark, with reference to the origin of the term “Beriberi,”—that, although this disease is commonly supposed to be peculiar to the natives of India, and most prevalent among the inhabitants of Ceylon and the Malabar Coast, yet it is by no means confined to them. Fifty-one out of our crew, during the first voyage, were from the coloured races; more than half of whom were stout, hardy Africans, Arabs, and Malays; the rest were men from Gogo, with a few from the Malabar Coast, and all suffered alike from Beriberi. The stoutest were the Africans and Arabs, who could not speak a word of Hindoostanee, and they, if any thing, suffered most; some died, and those who were discharged from the ship at Bombay, one and all, were in that stage of Beriberi, from which it is very doubtful if the majority ever recovered. This fact, in connexion with the similarity in sound and signification of Beriberi to بحري (bahri), the common Arabic word for *sailor*, from بحر the *sea*, led me to reflect on the origin of the term, which Bontius, who first called, it “Beriberia,”* affirms to be of oriental origin. Knowing therefore, that the disease is common among Arab sailors, and that, prevailing more at sea than on shore, the Arabs who from time immemorial have been the principal navigators of the Arabian Sea, ought consequently to be the people best acquainted with it, I conceived it much more probable, that the word should have originated with them, than on shore among the Nomadic population of Arabia, to whom the chances are, it is entirely unknown. (See Good’s Study of Medicine,

* Good’s Study of Medicine, Vol. iii. p. 352.

Vol. iii. p. 352, where, Beriberi is said to be the same with برابير (be-rabir) *tillage* and *its production*). How unsuccessfully it has been traced to an Indian origin, may be learned from the foot-notes in Mr. Malcolmson's Essay on Beriberi,* from which it would appear that the word "Beriberi," in its duplicate form, is not known in India, but only singly in combination with *soon*, signifying numbness, and *bayree* sheep, the latter in reference to the gait of that animal; neither of which characteristics is the predominant feature of the disease I have been describing,—but dyspnœa and lassitude, arising from an effusion of fluid into the cavities of the pleuræ, which we should call hydrothorax, but which a people unacquainted with the nature of the complaint, would designate "shortness of breath;" a state so emphatically described by بهير *anhelus*, *defatigatus*†, (when considered in connexion with Beriberi, as I have witnessed it,) and so aptly distinguished from all other affections of the kind by بحري *marinus*‡, when occurring in sailors, that, but for the aspirate and the difference in the vowel characters, points of little importance here, we have the word "Beriberi," in the literal transposition of the Arabic into Roman characters. Still more to the purpose, in point of signification, are the meanings assigned to "buhr" by Richardson§, which are, *shortness of breath*, *asthma*, &c., so that, with the specific denomination "bahri," *marine*, we have "buhr bahri," *marine shortness of breath or asthma*, a term so descriptive of Beriberi, that, by a people unacquainted with the nature of the disease, it could not be better designated. Aware, however, of the endless variety of opinions, and the plausibility that may exist in matters of this kind, I wish to insist on nothing, nor to go further than to submit with much diffidence, the conjectural remarks I have just made, for the consideration of those who may be interested in the derivation of the word; and regret for the sake of my argument that I did not think of the subject, when I might or might not have still further had the power of supporting it, by ascertaining the name by which Beriberi is known among the Arab sailors of the present day.

* Pages 4, 5, 6.

† Gol. Lex. Arab-Lat p. 225.

‡ Idem p. 337.

§ Pers. Arab. Eng. Dict.

APPENDIX.



APPENDIX.

Extract from a Report of Lieut. R. M. Johnstone, of the Commissariat Department, on the System of breeding Leeches at Hydrabad in Sindh.—Communicated by F. S. Arnott. M. D.

Presented January, 1846.

“The Leechman first of all dug a hole in the ground sufficiently deep to admit of a common sized chattee pot. In this he placed a small quantity of goat's manure ; a chattee pot with the mouth upwards was then placed in the hole thus dug to receive it. It was then filled with some reddish earth, and water was added until the whole was of the consistency of paste. One rupee's weight of bhang was mixed up with the earth, as also a very small quantity of cow-dung and assafœtida. Leeches were then placed on different parts of the Leechman's body, and after they had completely filled themselves by sucking his blood, were thrown into the chattee pot, the mouth of which was carefully closed.”

“In the manner above described five chattee pots were placed and filled; a few days afterwards I had ten more also filled. The Leechman chose out the coolest spot of ground in the garden surrounding my house, and as a general rule he informed me, that the chattee pots should be placed in a shady spot, and protected as much as possible from the winds. In the cold weather, *forty* days is the space allowed for the reproduction of the young leech, but in the hot weather *one month* is sufficient.”

“On the twentieth day from that on which the leeches were placed in the first five chattee pots, I opened each of them. The earth inside had been reduced to the consistency of mud, caused by the evaporation of a portion of the water. In this, the leeches had buried themselves, for their tracks could be distinctly seen. The Leechman begged me not to disturb the earth in any way, for in so doing the process of reproduction would be retarded if not stopped altogether ; I therefore did not remove any portion of the earth from the chattees. In some of the pots, however, and on the surface of the earth, I found one or two of the parent leeches. They were emitting from the “anus” a white, frothy matter, and which I imagine they afterwards desert, which, after changing its colour and hardening, forms itself into a cocoon, for I found one about the size of a pigeon's egg, but near to which was no leech. This I took out from the chattee. It was of an oval shape, and the outer coat resembled net-work of a straw colour. I divided it most carefully, and its contents, of a brownish colour, were exactly of the consistence of jelly.”

“ The blood which the leeches sucked prior to their being placed in the chattee pots for the purpose of breeding, no doubt afforded in some measure the nutritive matter and perhaps the colouring matter also. Between this coagulated matter and the outer or spongy coat, was a fine tough but flexible skin, apparently to protect the young leeches in their first stage of existence.”

“ I have again opened the chattee pots, and on breaking the earth into small pieces which has become somewhat hard, I have discovered in the cavities formed by the leeches numerous cocoons. In one pot, no less than fifty-two cocoons were found; the outer and spongy part of the cocoon has thickened considerably. On opening them, from fifteen to twenty young leeches, about an inch in length, were found in each; from ten old leeches no less than 400 young leeches have been produced. For six days they are to remain in water, being fed on a very small quantity of sugar. They will then be applied to the Leechman's body, and allowed to suck his blood. This will be repeated three or four times, and in twenty days they will be fit for hospital purposes. The old leeches on being applied to the human subject, can again be used for breeding purposes, and the experiment can be repeated for any number of times. The months most favorable for breeding in this country are March, April, and May.”

Note by the Secretary. The above extract will prove useful to those who may have occasion to superintend the breeding of leeches for themselves. It contains the details of a more extended investigation than that instituted by Dr. Gibson, who directed his attention to the subject some years since, in the Dekkan, and whose observations accompanied by some remarks, by Dr. Morehead, will be found in Vol. 1. of the Society's Transactions. Before, however, this process of breeding leeches can be considered more economical than, or preferable to, the common practice of selecting them from their natural habitations, the exact size of the leech at different periods of its growth, from the time it is taken from the cocoon, to its maximum of development, must be determined. We learn from Lieut. Johnstone's report, that, the young leeches on been taken from the cocoon, had nearly attained an inch in length, and, that in less than thirty days afterwards, (when they must have grown much more rapidly than leeches in Europe, to have exceeded an inch,) they were “ fit for hospital purposes.” The question, however, is not when they are “ fit &c.,” but, at what period after having been taken from the cocoon, do they attain that size which is *best* fitted for hospital, or rather medical purposes?

M. de Blainville, speaking of the slowness of the growth of leeches in Europe, states, from a note communicated to him by an apothecary at Dieppe, who had long devoted his attention to the subject,—that “ individuals, two years after they had left the cocoon, were very far from equalling in size, an ordinary leech of three inches in length.”* Dr. Johnson observes,—that, “ at the time of birth, they are nearly colourless, and continue so for many months, with very little increase as to size.”† M. de Plancy,‡—that, in the department of Finistère, where they collect the cocoons, and deposit them in ponds made for the purpose of receiving them, the Leech-dealers do not begin to collect the young leeches until eighteen months, at least, after they have quitted the cocoons; others state, that leeches require five years to bring them to maturity,

* Dic. des Sci. Nat. T. xl. p. 230. † Johnson on the Med. Leech p. 40. ‡ Idem. p. 13.

and that, "while very young, they are quite unfit for medical purposes;" yet, by Lieut. Johnstone's process, it would appear, that they are fit for hospital purposes 26 days after they have been liberated (about an inch long,) from the cocoon. But it is not to the length of a leech, which, when extended in the act of progression, may greatly exceed an inch, and yet possess a very small capacity for containing blood, that we should attach importance;—it is to its size generally, or rather to its weight, and then, if to obtain leeches of the size or weight best adapted for medical uses, it may be necessary to feed them for a year or more after they have been taken from the cocoon, it becomes questionable, if it would not be more generally economical, in the first instance, to select them of a proper size from their natural habitations, in countries where they abound, or to adopt the practice of the Leech-dealers in Finistere, of breeding them in ponds, than, to have recourse to the method described by Dr. Gibson, and Lieut. Johnstone. If the latter process possess any advantage over the European practice, it must be in accelerating the growth of leeches subjected to it, in this country, but it is for future investigation to prove this. From the information afforded Dr. Gibson, it would appear, that by the process followed in the Dekkan, the young leeches are ready for use within two months after they have been taken from the cocoon. In Lieut. Johnstone's process, 26 days are sufficient to fit them for hospital purposes; in both instances, their deliverance from the cocoon was forcibly expedited;—this, perhaps, may accelerate their growth, while their period of existence, not exceeding at the furthest six months, (according to the information given to Dr. Gibson)* may be shortened by it. But, in India, native accounts are seldom worth communicating before they have been confirmed by actual observation; it is quite sufficient for the Leechman to prove by the bites, that a certain number of leeches have been applied, without any reference to the size of the animals, or that of the wounds inflicted by them; the immediate abstraction of blood, in quantity, being as dependent on the one, as the amount of after-bleeding, *cæt. par.* is in proportion to the size of the other. Hence, the advantages to be derived from adopting the process of breeding leeches followed in the Dekkan and at Hyderabad, over the common practice of obtaining them, must depend on the *age* of the leeches bred by it, when they have attained that size which is best fitted for medical purposes.

A few notes of a case of Hydrocephalus (congenital) in which the head was three times tapped. By John Peet, Esq.

Presented April, 1847.

In May 1846, I attended Mrs.——in her second labor, which was tedious, though the pelvis was capacious, and the soft part yielding. The child when born was found to have a large head; the sutures were open, and the bones a good deal separated. Fluctuation was distinct in the spaces between the separated bones. During the time of my attendance upon Mrs.——after her confinement (a period of about three weeks) the child's head did not seem to increase in size, and all the functions were performed regularly and well. No medicine

* Vide loc. cit.

was given. From this time (three weeks after its birth) until the early part of September I saw nothing of the infant; in this month it was again shewn to me. The head had now increased greatly; it measured 26 inches in circumference, and 16 inches transversely from the opening of the meatus auditorius of one to a corresponding point on the opposite side. The frontal bone was widely separated from the parietal bones, as were the latter from the occipital. There was also a very considerable space in the situation of the sagittal suture, and its continuation through the frontal bone. The squamous sutures were likewise so open as to allow of much bulging of the fluid at each side of the head. The veins of the scalp were full and prominent; the great stretching of the skin drew the lids upwards and partly everted them, which with the marked bulging forward of the front part of the head, and its great size in relation to the face, gave the child a very unsightly appearance. Notwithstanding the size of the head, the child's health was good; its faculties seemed perfect, and all its functions were regularly performed. Its mother said it had never appeared to suffer in the slightest degree, and the only inconvenience was the weight of the head. There had never been strabismus, nor was it at any time convulsed. In size, it equalled the greater number of children of the same age.

Taking into consideration the enormous size which the head had already attained, the rapidity with which it was still enlarging, and the child's good state of health, it was judged by those who saw it to be a fair case for the trial of tapping. On the 10th September, in the presence of Drs. McLennan, Morehead, and Leith, the smallest sized trocar that could be procured, was introduced through the coronal suture some distance from the middle line, and close to the posterior edge of the frontal bone. It was passed to the depth of about $\frac{1}{4}$ inch, and about 28 oz. of fluid slightly tinged with blood, were drawn off. This was not nearly the whole of the contained fluid but a further flow was prevented, as the pulse fell and the child became pale and made two or three efforts to vomit; the fluid was not allowed to pass in an uninterrupted nor in a full stream through the canula; by placing the finger on the orifice, the stream was diminished, and occasionally stopped altogether for a short time. Pressure with the hands was kept up by Dr. Morehead during the whole time. The opening was afterwards closed and the head surrounded with broad straps of plaister, applied with sufficient tightness to maintain a considerable degree of pressure.

On the 2nd September, it was noticed that no bad symptoms had followed the operation; the bowels had been a little irregular for two or three days afterwards, but at that time all was going on well, and the head was much smaller than before it was tapped.

The following note was taken on the 7th. of October: "Has been in perfect health since the last report. The dimensions of the head taken to-day gave 23 inches in circumference, and 16 from ear to ear, being a decrease of 2 inches in the transverse, and of 3 in the other direction."

On the 12th October, the operation was repeated, the head having increased very rapidly during the preceding three or four days. The same trocar was used, and the opening made in nearly the same place as in the first tapping, but a laced cap was substituted for the pressure by the hand. As the fluid was evacuated, the cap was gradually laced so as to keep up a certain amount of

equable pressure. When about 16 oz. had been drawn off, the child became pale and the pulse fell; the flow was therefore stopped for a few minutes, and afterwards about one ounce more fluid was taken away, when the pulse becoming still weaker the canula was withdrawn. About two ounces of fluid oozed from the opening after the canula had been removed; in all about 19 oz. were evacuated. The cap was now tightly laced and straps of plaister applied over it.

On the 5th of October it was observed—"No symptoms of any kind have followed the operation and the child is as well as before it was performed. No medicine has been given."

For some time after this tapping the fluid reformed very slowly, but in the early part of November, the head began to enlarge even more rapidly than before the last operation. On the 15th November, it measured 26 inches in circumference, and 16 inches from ear to ear. The health seemed perfectly good. The tapping was repeated on this day in the same manner and in the same place as before; 20 oz. of fluid were drawn off, and the head was afterwards surrounded with straps of plaister.

During the remainder of this month there were no constitutional symptoms, but the head enlarged much more rapidly than after either of the preceding operations. In the early part of December the child became dull, shewed a disinclination to take the breast, and vomited at intervals. The skin soon afterwards lost its warmth; the pulse became feeble; and almost every thing given was vomited. With these symptoms there was neither strabismus, nor twitchings of any kind, but the child lay in a sort of half comatose state. Under the use of stimulants some improvement was occasionally observable, but it was of but short duration; so soon as the immediate effect of the stimulant had gone off, the child relapsed into its former collapsed state. During this time the head enlarged with great rapidity.

On the 10th of Dec. it was noticed—"There is no improvement. Collapse continues. Refuses the breast. Pulse feeble and frequent. Eyes sunken and almost insensible to the touch."

On the 15th Dec. There had been no change in the symptoms, but the child was becoming thin and emaciated. It died on the 19th Dec. There was no convulsion to the last, and death seemed to have resulted in a great measure from inanition.

Rupture of the Interventricular Partition of the Heart from external violence.

By H. J. Carter, Esq. Assistant Surgeon.

Presented August, 1847.

On Monday morning, August 16th 1847, I was called to examine the body of a Parsee named Cajee Anderjee, by occupation a Porter and Water-carrier, aged about 40 years, robust and well formed. He had been knocked down by the shaft of a four-wheeled vehicle, on the preceding Friday afternoon, about five o'clock, and had died about the same hour on the following Sunday.

The expression of the countenance was placid and natural ; there was a sanguineous fluid oozing from the corner of the mouth. On several parts of the body there were marks of external violence, viz. over the upper part of the sternum, the elbow joint of the right arm and the knees anteriorly, and posteriorly, there was a succession of bruises from the sacrum to midway between the shoulders. Some of these were linear in their figure, and such as might have been produced by the tire of a wheel ; in all, the cuticle was more or less destroyed. On the prominent part of the parietal bone, of the left side, there was an ecchymosed tumor about half the size of a hen's egg, with a wound on it. There were no marks of disease externally, no fractures of the bones or dislocations of the extremities. On raising the scalp, the extravasated blood of the tumor mentioned was seen to extend over a circumference of about six inches ; the parietal bone immediately under it was not injured, nor was there any fracture of the cranium or base of the skull. On opening the head, there was no redness or discoloration of the dura mater opposite the external injury, and no lesion in any part of the brain or its membranes, neither were there any traces of disease ; but the blood was unusually fluid, and in the pendent state of the head, nearly all in the body flowed out from the sinus communicating with the great internal vein of the neck. On reflecting the integuments of the chest, and abdomen, a slight extravasation of blood was perceived under the bruise situated at the upper part of the sternum, but nothing further. I then opened the chest and found the lungs unnaturally distended with air and blood. There were about six ounces of sanguineous fluid in the left, and about four ounces in the right cavity of the chest ; the lining membrane against the ribs and that covering the lungs was smooth, perfect and uninjured ; and none of the ribs were fractured. On inspecting the abdomen there was no mark of injury discoverable any where, except about the base and concavity of the sacrum, where there was much extravasated blood, under the peritoneum, opposite to the marks of violence observed externally ; the bladder was greatly distended with urine. There were no traces of organic disease either in the chest or the abdomen. The lungs were taken from their cavity, and I found them much gorged with blood, and their structure easily broken down. In the bronchi was a secretion tinged with blood similar to that which I have said was oozing from the mouth. I then opened the pericardium, in which there was little or no fluid ; the cavities of the heart were also empty ; and, on carefully examining the right ventricle, I perceived an aperture, large enough to admit a small walnut, (about three quarters of an inch in diameter), close to the apex of the interventricular partition. Its circumference was soft, shreddy, whitish, and lymphic ; it formed a direct communication between the ventricles, was of recent occurrence, and, in all probability, had been occasioned by a fall or by force communicated from without.

Such was my evidence before the Jury.—The following additional observations were made during the *post mortem* examination, viz. The face was not swollen or livid, but there were circumscribed spots of Purpura, (the largest about a quarter of an inch in diameter,) scattered over the shoulders and right side of the trunk. Excepting the contusions about the sacrum and over the parietal bone, there were no others which appeared to have been

produced by much violence ; those on the back, were on the right side of the vertebral column, and from their disposition, it appeared, as if the wheel had first struck the sacrum, and afterwards, had travelled longitudinally over the back, passing off the body, between the neck and the right shoulder. The scars on the knees and on the upper part of the sternum, all trifling in extent, might have been occasioned by the first blow projecting the body forwards on the ground. The brain was uninjured, its substance was firm, and natural in every direction ; there was no turgescence of its vessels, though this might have existed, and have disappeared when the head was raised, on account of the blood, (from its extreme fluidity,) gravitating towards the lowest parts of the body.

The congested and livid state of the lungs, their volume, nearly filling the cavities of the chest, and the presence of bloody serum in the pleuræ, induced me to seek diligently for contusions of the soft parts, or fractures of the bones forming the skeleton of the thorax ; but I found none, and the pleuræ were smooth and entire throughout, but reddened from capillary congestion, as in the first stage of inflammation. The viscera of the abdomen were next examined, *in situ*, and I am inclined to think, that the distended state of the bladder, mentioned in my evidence, might have arisen from some injury of the sacral nerves. The vessels and organs occupying the upper part of the mediastinum, were now transversely divided close to the neck, and the whole mass of the viscera of the thorax and abdomen, being dragged downwards were at once removed. On laying open the lower part of the trachea, and bronchi, the bloody fluid which was present in those tubes together with the congested state of the substance of the lungs, its fragility, and the frothy blood which issued from it on pressure, left no doubt of the first stage of pneumonia having existed ; but there were no spots of pulmonary apoplexy, although the congestion was enormous. The heart on being cut from its vascular attachments, looked so natural in size and appearance, that I began to anticipate the necessity of further search for the cause of death. On examining its ventricles, however, I detected the aperture mentioned, which was not circular but narrow and irregular, with beveled edges, which were neither “ polished ” or “ fibrous,” as in congenital deficiency of the interventricular partition,* nor raised nor defined as the edge of an ulcer, but soft and pulpy as the edges of a wound in which the first stage of the healing process has commenced, and whiter than the muscular tissue in which it was situated. I regret that, excepting the normal and healthy state of the thoracic aorta up to the pericardium, I can add nothing more to the description of this interesting case ; the heart had been placed aside for more deliberate examination, but circumstances occurred which suddenly deprived me of it.

It appears from the evidence given on the inquest, that the deceased was a man of temperate habits, and perfectly well in health before the accident took place. He was walking in the road when the left shaft of the vehicle, which overtook him, came in contact with his back and knocked him forwards upon his hands and knees ; the axle-trees are said to have passed over his back, and the step to have struck him, but he escaped the wheels, (the latter I think doubtful). He was taken up insensible, but he recovered from

* Copland Dic. of Prac. Med. ar Heart. p. 225.

the shock during the evening, and about 8 P. M. complained of pains in his back, neck, arms and legs; and the following day about 2 P. M. of great exhaustion; the day afterwards he died, about 5 P. M. having lived just forty eight hours after the occurrence of the accident.

Remark. In ruptures of the heart from external violence, M. Olivier states that their seat is more frequently in the right than in the left cavities,—the reverse of that which takes place when the rupture happens from other causes. Out of 11 cases occurring from external violence, the right cavities were torn in 8, and the left in 3, and in 6 of these cases, the seat of the rupture was in the auricles; * no where does he allude to a rupture of the interventricular partition from external violence, nor have I been able to find a parallel case to the one described in any of the medical works to which I have at present access.

Case of Poisoning from Arsenic in which the symptoms of Narcotism were prominent at the commencement. By C. Morehead, M. D.

Presented July, 1847.

A Hindoo Goldsmith, of about 30 years of age, was brought to the Jamsetjee Jejeebhoy Hospital on the morning of the 21st May, 1847, at 6 A. M. He had been picked up by the Police on the public street. He was comatose—his pupils were dilated, the breathing was natural—the pulse frequent—there was no appearance of injury, and no emaciation or sign of long continued sickness.

As he was being lifted from the cart in which he had been conveyed to the hospital, he vomited a little bilious matter. Nothing was known of his history.

Cold affusion was used to the head, and an emetic of Ipecacuanha and Carbonate of Ammonia was given.—The emetic acted readily and he became sensible. He vomited several times during the day and was purged two or three times the evacuations consisting of gelatinous looking mucus. Towards evening the pulse had become very feeble, the breathing hurried, the thirst and anxiety considerable with occasional retching.—He died about 5 o'clock A. M. on the 22nd instant.

The only statement he made was, that he had eaten some sweetmeats the night before he was brought to hospital. The result of the Coroner's Inquest was that he had taken poison himself.

Inspection 6 hours after death. The body was in good condition. *Abdomen.* There was a general blush of redness over the peritoneal covering of the stomach and small intestines—but no effusion into the sac of the peritoneum.

The stomach was opened and found to contain about 6 ounces of a dark watery fluid with mucous sediment, partly tinged with blood—and containing some white gritty particles. There was general redness of the mucous lining of the stomach, characterized towards the cardiac end by a dark patch-like arrangement; and towards the pyloric end there was a dark and more dif-

* Encyclograph. des Sciences Medicales Ed. Brux. art. Coeur.

fused redness leading to an almost black patch about 3 inches long and two in short diameter, raised somewhat above the general level, and abraded in part of its surface—There was dark redness in patches of the mucous lining of the duodenum and a general blush with increased secretion of mucus on that of the jejunum, end of the ileum and cæcum.

The thoracic viscera were healthy, there was slight congestion of the vessels of the pia mater of the brain.

For the following note of the analysis of the contents of the stomach, I am indebted to Dr. Giraud.

“About 4 ounces of a mucous flocculent fluid taken from the stomach, containing a few minute white brittle particles. These particles weighing about the 10th of a grain were sublimed in a tube into a white crystalline ring;—this with the part of the tube on which it was deposited, being placed in a reduction tube with charcoal powder, gave a steel grey metallic ring, which, on being heated in a wide tube, was reconverted into a white crystalline sublimate.”

“By Reinsch’s process metallic deposition on copper was obtained from the above mentioned fluid; this yielded a white crystalline sublimate, which on solution in water gave the characteristic effects of arsenious acid with Ammoniaco-nitrate of Silver, Ammoniaco-sulphate of Copper, and Sulphuretted Hydrogen.”

“By the foregoing processes arsenious acid and metallic arsenic were obtained from the white particles found in the fluid of the stomach; and from the fluid itself metallic arsenic was procured, and made to pass through its various compounds of Arsenious Acid, Arsenite of Silver, Arsenite of Copper, and Orpiment.”

Remark.—The interest in this case consists in the strongly marked narcotic symptoms shewn on admission into hospital.—It was viewed then as a case of narcotic poisoning and treated as such. Subsequently its nature was sufficiently evident. A circumstance not noted in the case attracted my attention, when the narcotic symptoms were present—There was a fixed frown on the countenance, an expression of suffering not usual in simple narcotism, and to which probably more importance as a diagnostic sign, should have been attached.

Notes on the Species, Structure, and Animality of the Freshwater Sponges in the Tanks of Bombay. (Genus; *Spongilla*.) By H. J. CARTER, Esq. Assistant Surgeon.

Presented September, 1847.

There are four species of Freshwater Sponges in the Tanks of Bombay, each of which is readily distinguished by the following characters:

Two are known from the other two by the peculiar form of the spicula which encrust their seedlike bodies.

No. 1. Is darkly cinereous or mouse-colored when dry, purplish under water, when alive; encrusting, repent, spreading in circular patches when iso-

lated. Smooth or interrupted by gentle eminences on the surface ; attaining the thickness of half an inch in the centre ; oscula tending towards a quincuncial arrangement ; texture compact, fine, delicate ; structure rectangularly reticulated ; friable. Seed-like bodies spherical, 1—67th. of an inch in diameter. Spicula of two kinds, large and small ; large spicula smooth, slightly curved, pointed at each end, 1—80th. of an inch long ; small spicula, straight or slightly curved, thickly spiniferous 1—400th. of an inch long.

No. 2. Is of a faintly yellow or bright green color ; encrusting, repent, spreading in irregular patches on fixed bodies, globular when surrounding a floating nucleus ; even or interrupted by gentle eminences on the surface when fixed, presenting meandering ridges and sulci when attached to floating bodies ; attaining the thickness of half an inch when fixed, of two inches when floating ; texture coarse and open ; structure rectangularly reticulated with a suberose crust slightly tenacious. Seed-like bodies spherical 1—36th. of an inch in diameter. Spicula of two kinds, large and small ; large spicula smooth, slightly curved pointed at each end, 1—57th. of an inch long ; small spicula smooth or thickly spiniferous, slightly curved or straight 1—200th. of an inch long. Transparent portions of investing membrane abounding in the small spicula.

No. 3. Is of a light yellow color ; massive, spreading ; convex, with short irregularly formed conical projections on the surface, or meandering ridges with sulci between them ; attaining a thickness of two inches ; texture fine ; structure fibrous, plumose, obliquely reticulated towards the base, rectangularly reticulated towards the circumference ; friable. Seed-like bodies spherical and 1—40th. of an inch in diameter. Spicula of two kinds, large and small ; large spicula, smooth, slightly curved, pointed at both ends, 1—57th. of an inch long ; small spicula, composed of a straight portion, sometimes slightly spiniferous, terminated at each end by a toothed disk with its points recurved or horizontal ; the central portion is 1—400th. of an inch long, the disks 1—600th of an inch in diameter.

No. 4. Is of a bright yellow color ; massive, spreading ; horizontal on the surface, with projecting, plumose, irregular portions ; attaining a thickness of about two inches ; texture coarse, loose ; structure fibrous branched, plumose, obliquely reticulated ; semifriable, may be compressed with the hand in water without undergoing much injury. Seed-like bodies ovoid, 1—28th. of an inch in their long diameter, and 1—50th. of an inch in their short diameter. Spicula of two kinds, large and small ; large spicula, smooth, slightly curved, pointed at each end, 1—66th. of an inch long ; small spicula 1—300th. of an inch long ; consisting of a straight portion, terminated by a toothed disk at each end, with its points recurved or horizontal, 1—950th of an inch in diameter. Transparent portions of investing membrane, abounding in little silicious stellated bodies, their arms projecting from a central cell, tapering to a point which ends in a stellated circle of recurved spines ; they are 1—600th. part of an inch in diameter.

The measurements of the seedlike bodies, and the spicula, are taken from the average size of the largest of their kind.

Habitat. On the inclined and under surfaces of rocks, or attached to floating bodies in the tanks of Bombay ; never at the bottom, and sometimes so high up as to be only covered by water three or four months in the year.

Investing Membrane. The investing membrane of the Freshwater Sponge, like the skin and the mucous membrane in the human body, is continuous throughout; and, like a shut sac, surrounds the parenchymatous structure and spicular skeleton of the whole mass, without enclosing it. In some instances, it abounds in spicula, as in No. 2, where they are mostly spiniferous, and in No. 4, where they are of the curious stellated form described. There are also in addition, little sac-like bodies which are ever changing their form and vibrating particles, both of which will be hereafter mentioned. If a portion of the membrane be carefully held before the blowpipe under a red heat, the animal matter may be driven off, while the forms of the bodies mentioned appear to remain unaltered; sometimes even a silicious skeleton of the membrane itself may remain, so thoroughly does silex pervade every portion of its structure. But there is a transparent reticulated net work (probably filamentous) which can only be seen when the membrane is fresh.

Spicula. The smooth spicula and the spicula terminated by toothed disks are hollow. In the smooth spiculum the form of its cavity may be seen by charring the animal matter which lines its interior. It will be found to be wide in the body of the spiculum, and to terminate abruptly at each end in a linear continuation. I have not been able to see it in the spiniferous spicula, on account of the number of little spines which encrust them.

The small spicula in each species are principally derived from the crusts of its seed-like bodies. In all the species the spicula are silicious, and the largest are so much alike that they are of no use as a specific distinction.

Seed-like bodies. The seed-like bodies are spherical or ovoid, according to the species. They all present an infundibular depression communicating with their interior, when young, they are transparent and filled with minute granules like the vibrating bodies to be hereafter mentioned; as they get older, a crust of silicious spicula, arranged perpendicularly to their surface, is secreted from their external membrane; it is from this crust that the small spicula in the different species are principally derived. In No. 1, and 2, they are straight, or slightly curved, and spiniferous. In No. 3 and 4, they are straight, sometimes spiniferous, and terminated at each end by a toothed disk; the disks of their free extremities surmount little papillary projections on the surface of the seed-like body, and they present a hole in their centre, which communicates with the cavity of the spiculum on which they are supported; their fixed ends are applied by a similar disk to the silicifying or external membrane of the seed-like body. The latter is coriaceous, and presents a hexagonally tessellated appearance, on which rest the fixed disks of the spicular crust. I could not perceive any holes in the centres of these hexagonal divisions.

Before the seed-like body arrives at its state of maturity, it is filled with minute granules suspended in a viscid transparent fluid; afterwards these are parcelled out into spherical transparent cells, equal in size and very numerous what becomes of them then, I cannot say; but I have often observed in the reticulated structure of the dried Spongilla, a group of the spicula of the seed-like bodies, thrown together in an irregular manner, and I would infer from it, that, when the young Spongillæ are sufficiently advanced to be capable of supporting an independent existence, the seed-like body containing them is burst,

and all traces of it disappear, except the group of spicula mentioned ;—and, for the young Spongillæ, it appears to me that, sometime after they have been liberated, they become stationary, and passing into the form of a seed-like body, ultimately end in being the reproductive sacs of their own species.

Most of these seed-like bodies although they have been exposed in a piece of sponge to the direct rays of a tropical sun for a whole year, on a black dry rock, will, on being cut open, present a fresh looking, yellow, transparent, viscid granular matter in their cavities, not unlike the yolk of a hard-boiled egg. They do not appear to possess in themselves any power of locomotion, and their being transported from place to place, or their adhering to the perpendicular or inclined surfaces of bodies, may depend upon the presence of one or more of the little animals I am about to describe.

Animality.—As to the animality of the Freshwater Sponge, I think there can be no doubt whatever. Look, for instance, at a ragged portion of it, torn off with a needle, (under a magnifying glass of one tenth of an inch focus,) and it will be seen gradually to assume a spheroidal form ; and, if there be a spiculum near, it will embrace it within its substance, it may be seen even to approach it, and as it were spit itself upon it ; still watch it, and it may bear away the spiculum ; and then, regard its circumference, and on it will be observed little papillæ, which gradually vary their form, extending and retracting themselves, until one of them may be seen to detach itself from the parent mass and go off to another object. This little animal, one of the group which it has left, may remain stationary on the second object, or descend to the watch glass, assuming in its progress all forms that can be imagined, spheroidal or polygonal ; while every point of its body appears capable of extending itself into a tubular attenuated prolongation. When dead and dry on the watch-glass, it is sometimes transparent, sometimes filled or surrounded by granular bodies, and though frequently irregular in shape, its natural form appears to approach nearest to that of a Florence flask, sometimes more sometimes less globular ; it is then (though its size varies with its age) about the one thousandth part of an inch in diameter, not including the elongated portion, which in length, is about one quarter of the diameter of the body, and apparently corrugated like the neck of the entozoon *Cysticircus longicollis*. These transparent little sacs (the gemules of Grant and Hogg?) are sometimes filled with green matter. They appear to be able to adapt themselves to any form that may be convenient for them to assume, and when forcibly separated from each other (by tearing to pieces a minute portion of the Sponge under water in a watch-glass,) the isolated individuals, may be seen to approach each other, and to apply themselves together in twos and threes &c. and so on, until, from a particle only discernible by the microscope, they assume the form of an aggregate visible to the naked eye, and such a portion, growing and multiplying, might ultimately reach the size of the largest masses adhering to the sides of the tanks at Bombay. They appear to belong to the genus *Amæba* of Ehrenburg. Dujardin has recognized them, and they are correctly figured (as they appear under a lens of one tenth of an inch focus) in Johnston's British Sponges, p. 61 ;—as well as certain filaments, which the day after a piece of Sponge has been treated in the way which I have just mentioned, may be seen exten-

ded from them, terminating or not in little transparent bulbs; floating, or fixed by their extremities, branching irregularly, long or short, each branch terminating or not in a bulb, and presenting similar pedicellated bulbs here and there in its course; when fixed on the watch-glass, disposed irregularly in straight lines intersecting each other,—radiating from a common centre or bulb, or in the form of an areolar membrane; frequently moniliform, as if they grew by the addition of cells to their free extremities.

The aggregated position of the animals I have described, imbedded in the transparent tissue of the sponge, bears a great resemblance to that of some of the Compound Tunicated Animals; especially in their ultimate development into a mass, intersected in all directions by canals, to allow of the presence of that element, which is necessary for their existence,—the freedom they possess in the early part of their life, of moving through the water or creeping over the surfaces of solid bodies, and their ultimate destination of becoming permanently fixed in a granulo-gelatinous mass, secreted or formed by themselves.

There is also a curious fact connected with the vitality of the Freshwater Sponges, and I think it also prevails with the Sea Sponges, for it was by observing the latter and their seed-like bodies, in the amorphous species, that I was first led to notice it. It is, that they may be taken out of their natural element, dried, and kept for months, without losing their vitality. This I have inferred, from observing the Sponges attached to the rocks on the upper parts of the tanks, which are uncovered for many months of the year, (indeed the greater part of it,) to be now again in the full performance of all their vital functions. I have not yet been able to prove it entirely to my satisfaction by direct experiment, but, on the sides of a finger-glass in which I placed an old dried portion of No. 1, about a month since, changing the water daily, there are now growing, atoms of new sponge visible to the naked eye and there are large portions of the original mass adhering to other objects in the same vessel; but I have not yet been able to satisfy myself of the presence of new tissue in the latter.

Supplementary note.—Since writing the above “Notes,” I have had the pleasure of reading Mr. Hogg’s “*Observations on the Spongilla fluviatilis &c.*,” published in the Transactions of the Linnean Society, Vol. XVIII, part 3d. wherein he advocates the opinion of its vegetable nature; but, when in support of his views, he quotes Dr. Johnston’s remark on Dujardin’s experiments, p. 396,—viz, that “locomotion is no proof of animality. Several *Algæ* are locomotive.” it must of course mean such movements as do not appear to be directed by an instinctive power; for, there are certain changes of form accompanying locomotion, which convey an impression to the mind of the presence of a guiding influence, beyond any thing that is met with in the vegetable kingdom, and which would seem to require no additional evidence to prove to the observer, that he is regarding motions peculiar to animal life. Such appear to me to be evinced by the young *Spongillæ*.

Moreover, I have ascertained by experiment, that when the transparent spherical capsules, which contain the granules within the seed-like bodies (in

No. 4.) are liberated, (by breaking open the latter under water in a watch-glass) their first act is to burst ;—this takes place during the first 36 hours, and their granules, which will presently be seen to be the true ova of a proteaniform infusorium, varying in diameter from about the 1—4300th part of an inch to a mere point, gradually and uniformly become spread over the surface of the watch-glass. On the second or third day, (for this varies) each granule will be observed to be provided with an extensible, pseudo-pediform base ; and the day after, most of the largest may be seen slowly progressing by its aid, or gliding over the surface of the watch-glass in a globular form, by means of some other locomotive organs.* During the time that these changes are going on, the smaller granules, most of which also have an extensible base, amass themselves together in irregularly formed portions of granulo-gelatinous matter, while a few of the more matured animals, averaging 1—300th part of an inch in length when extended, may generally be observed creeping about, singly or in pairs, with a number of globular bodies within them, varying in diameter from the 1—2150th to the 1—1075th of an inch ; similar bodies also may be seen here and there, singly or associated together, fixed to the watch-glass by a plastic granulo-gelatinous matter, and bound down by filamentous threads (such as I have before mentioned) parting from them in different directions. After some days, from being nearly transparent in the first instance, the granular matter with which they are filled, becomes more defined and evident, and as they enlarge, their circumference presents a cortical investment like that of the seed-like bodies : their color also becomes brownish and their circumference from being at first smooth and defined, rough and irregular ; they appear to be motionless in themselves, however much the matter contained within them may assume different shapes, and that peculiarity connected with their size and general appearance, is quite sufficient to distinguish them from the granules of the matter in which they are imbedded. In the different stages of development I have mentioned, these bodies may be viewed, both within and without the more matured Protean, but, as I have not yet seen them deposited or fixed to the watch-glass by the animal itself, I am unable confidently to state that they contain its proper ova : should they prove to do so hereafter, the assumption that the animal itself ultimately passes into the form of a seed-like body may not be worth much.

The development of the ovum appears to take place in the following way.—When first liberated from the spherical cells of the seed-like bodies, it consists of an ovoid or globular sac of greenish homogeneous matter, surmounted by a red spot and enclosed within a transparent envelope : the former then changes in shape, becomes granular, and its granules obtain a certain latitude of motion ; thus transformed, it occupies and projects above the upper part of its transparent envelope, which in its turn enlarges and becomes spherical. Should the ovum in the commencement not have been firmly bound down by the filamentous structure to which I have alluded, the granulo-plastic matter, and the agglomeration of the minute vibrating bodies which accumulate around it and which appear to be actively engaged in this part of the process, it may become vagrant, but if otherwise, it has probably become fixed for the whole

* The same changes take place in the granular matter from the dried seed-like body.

period of its existence; unless, as I have observed in some gemules when kept in distilled water, that the whole community appear to find it necessary to separate and forsake their spicular structure to go in search of food.

The form of the young Proteans from the granular matter taken from the seed-like bodies of Nos. 2 and 4, resemble *P. diffluens*, (Muller);* that which chiefly accompanies No. 4 is of the figure given by Dujardin, to which I have already had occasion to allude; while the vibrating bodies themselves when combined, take on the appearance of minute Proteans, and every particle of the fixed transparent granulo-gelatinous matter, which serves as a nidus for the whole, appears to be endowed with the power of continually extending, retracting, and altering its shape.

I have further observed, that the granulo-gelatinous transparent matter has in some places, arranged itself into the forms of full sized spicula, disposed in linear continuation, overreaching each other side by side, just as they are seen in the fibrous structure of the old sponge; their surfaces however are not yet silicified; nor should I expect this to take place, as my experiments have been conducted with distilled water, had not Dr. Grant mentioned that silicious spicula were formed in the gemules of *Spongilla* which he nourished with rainwater.

Thus, does every step towards the ultimate structure of the Freshwater Sponge, every form that is taken by the living matter of which it is composed, appear still more nearly to approximate it to the nature of the Genera of Ehrenberg's *Pseudopodia*.

* Blainville, Manuel d'Actinologie. (Atlas, pl. 11, fig 12.)

REGULATIONS

OF THE

MEDICAL AND PHYSICAL SOCIETY OF BOMBAY.

M. DCCC. XLVII.

Object.

I. The encouragement of the cultivation of Medical Science and its collateral branches, by discussion at periodical meetings, and by the publication of original communications.

Constitution.

II. The Society is composed of Ordinary, Corresponding, and Honorary Members.

Ordinary Members.

III. Under the head of Ordinary Members are to be classed all who contribute to the funds of the Society, and all who are admitted in accordance with Regulation VII.

IV. All Medical men residing in India who can produce certificates of a regular medical education, are eligible as Ordinary Members.

V. Medical Officers of Her Majesty's or the Hon'ble Company's Service, are elected ordinary members of the Society on application by letter addressed to the Secretary.

VI. Qualified Medical Practitioners not belonging to Her Majesty's or the Hon'ble Company's Service, are elected by ballot at the ordinary meetings of the Society, and a majority of three fourths of the members present is necessary to secure the election.

VII. Assistant Surgeons on first entering the Bombay Medical Service are considered ordinary members of the Society, free of the payment of admission fee and annual subscription, and continue so for a period of two years, after which, should they not intimate their wish to be considered ordinary members by payment of the regulated admission fee and annual subscription, they are considered to have withdrawn from the Society.

Payments.

VIII. Ordinary members to pay an admission fee of Rs. 5, and an annual subscription of Rs. 12, payable in advance in the month of January of each year.

IX. Ordinary members absent from India, are not chargeable with subscriptions for the period of their absence.

X. Ordinary members neglecting to pay their annual subscription, for two successive years, are considered to have withdrawn from the Society, and are liable to have their names erased from the list of members, under a resolution passed to that effect, at an ordinary meeting of the Society.

Corresponding Members.

XI. Ordinary members on retiring from service in India, on being proposed and seconded at an ordinary meeting of the Society, are eligible by ballot, as Corresponding Members. A majority of four fifths of the members present is necessary to secure their election.

Honorary Members.

XII. Medical men of celebrity not residing in India are eligible as Honorary Members. On being proposed, and seconded at an ordinary meeting of the Society, they may be elected at the next meeting by the unanimous consent of the members present.

Election of Office-Bearers.

XIII. The Committee of Management of the Society consists of eight members, elected annually from among the ordinary members resident in Bombay by the general vote of the ordinary members residing under the Government of Bombay.

XIV. The voting lists are circulated in the first week of November of each year, and the result of the election is declared at the next ordinary meeting of the Society.

XV. In the event of vacancies occurring in the Committee between the periods of election, such vacancies to be filled up in rotation, by the individuals who commanded the number of votes next to those of the members returned at the last election.

XVI. A President, and two Vice-Presidents of the Society, are elected annually from among the members of the Committee of Management, by the members of the Society present at the ordinary meeting at which the annual election of the Committee is declared.

XVII. The Secretary of the Society is elected biennially from among the ordinary members resident in Bombay, at the ordinary meeting held in the month of January of alternate years, or, on the occurrence of a vacancy, at any other ordinary meeting of the Society.

Committee of Management.

XVIII. The Committee of Management have the general direction of the affairs of the Society and decide on what communications are to be published in the Transactions of the Society. They keep minutes of all their proceedings which are entered into the minute-book of the Society and read at the following ordinary meeting.

XIX. When questions of importance to the stability and interests of the Society arise, such shall be submitted by the Committee for decision to the ordinary members residing under the Government of Bombay. The majority

of votes necessary to decide any questions, to be determined according to its importance, and fixed at the time, by the Committee. *

XX. It shall form part of the duty of the Committee to give due consideration to all suggestions offered by members of the Society.

President and Vice-Presidents.

XXI. The President shall take the chair and conduct the business at all meetings of the Society.

XXII. In the absence of the President one of the Vice-Presidents shall take the chair, and conduct the business of the meeting, and in case neither be present the senior member at the meeting shall preside.

Secretary.

XXIII. The Secretary is a member of the Committee of Management *ex-officio*.

XXIV. It shall be his duty to enter into the minute-book of the Society, minutes of the proceedings of all meetings and transactions of the Society, and in communication with the Committee of Management to conduct the details of business and carry on the correspondence of the Society.

XXV. The Secretary shall prepare an annual statement of the receipts and disbursements of the Society, to be laid before the ordinary meeting in the month of January of each year.

XXVI. To enable the Secretary to perform these duties, a suitable establishment is entertained under the sanction of the Committee of Management, confirmed at an ordinary meeting of the Society.

Meetings.

XXVII. Ordinary Meetings of the Society are held in Bombay on the first Saturday in the months of January, April, July, and October; and more frequently if deemed expedient.

XXVIII. The chair being taken, the order of business shall be as follows:—

1. The Minutes of the last meeting, and those of subsequent Committee meetings to be read and confirmed.
2. The announcement and election of new members in accordance with Regulations V, VI and VII.
3. The election of Corresponding and Honorary Members.
4. The reading of letters, and the discussion of any ordinary business of the Society which may be before the meeting.
5. The announcement of presents and donations.
6. That of papers and dissertations received since the last meeting.

XXIX. After the announcement of the papers and dissertations, the President shall call upon the Secretary to read one or more of them, and shall subsequently invite the members to discuss any particular part of them which they may consider deserving of remark.

XXX. No new business shall be introduced until that which is before the meeting has been concluded.

Papers and Dissertations.

XXXI. All papers and dissertations presented to the Society to be considered the property of the Society.

XXXII. The Transactions of the Society are published by the Secretary in communication with the Committee as often as circumstances will admit.

XXXIII. A copy of each publication is presented to the Honorary and Corresponding members of the Society, and to every Ordinary member who at the time of publication is a contributor to the funds of the Society.

N. B. The Medical Board has kindly permitted that letters and communications on the business of the Society, to the address of the Secretary to the Society, may be transmitted *under cover* to the Secretary to the Medical Board. In this manner they will pass free of postage, but not otherwise.

Members are requested to pay the amount of their subscriptions to Messrs. Leckie, and Co. the Society's Agents.

PROCEEDINGS
OF THE
MEDICAL AND PHYSICAL SOCIETY OF BOMBAY
FOR THE YEAR 1845.

COMMITTEE OF MANAGEMENT.

President.

R. PINHEY, Esq.

Members.

R. WIGHT, Esq.	A. GRAHAM, Esq.
J. McLENNAN, Esq.	J. BURNES, K. H.

Secretary.

C. MOREHEAD, M. D.

Members Elected.

J. F. Smith, M. D.; J. E. Stocks, M. D.; W. C. Coles, M. D.; R. Nicholson, M. D.; and J. F. Shekleton, M. D., Assistant Surgeons, Bombay Establishment, elected in accordance with Regulation VII.

Communications presented.

1. Letters from H. R. Elliott, Esq., and T. Lodwick, Esq., requesting that their names may be withdrawn from the list of members.

2. A letter from Charles Pickering, Esq., acknowledging the receipt of six Numbers of the Society's Transactions.

3. Letters from the Royal College of Surgeons, and Sir J. McGregor, Bart. Director General of the Army Medical Department, acknowledging the receipt of a copy of the Society's Transactions.

4. Notes on the Pathology and Treatment of Dysentery, as observed in the European General Hospital at Bombay, during the five years, from July 1838 to July 1843, by C. Morehead, M. D.

5. Cursory Notes on Apoplexy, Thoracic Inflammations, Phthisis Pulmonalis, Hepatitis, Spasmodic Cholera, Small-Pox, Scurvy, and Rheumatism, as observed in the European General Hospital at Bombay, during the five years, from July 1st 1838, to July 1st 1843 by C. Morehead, M. D.

6. Report of a serious accident which happened to a boy on board H. C. Brig Euphrates with some remarks, by W. J. Stuart, Esq.

List of Donations for the Library.

1. Two copies of the Report of the Medical Topography and Statistics of the Ceded Districts, completed from the records of the Medical Board Office of Madras, published by order of Government. Presented by the Medical Board of Bombay.

2. Two copies of the Report on the Medical Topography and Statistics of the provinces of Malabar and Canara, completed from the records of the Medical Board Office of Madras, published by order of Government. Presented by the Medical Board of Bombay.

3. Two copies of the Report on the Medical Topography and Statistics of the Southern Division of the Madras Army, compiled from the records of the Medical Board Office of Madras, published by order of Government. Presented by the Medical Board of Bombay.

4. Two copies of the Pathologia Indica, or the Anatomy of Indian Diseases, Medical and Surgical, based upon morbid specimens from all parts of India, in the museum of the Calcutta Medical College; illustrated by detailed cases with the prescriptions and treatment employed, and comments Physiological, Practical, and Historical, by Allen Webb, B. M. S. PART I. Presented by the Medical Board of Bombay.

Proposition.

I beg to propose to the Committee of the Medical Society, that in accordance with the custom of other similar bodies, the Society hold Quarterly Meetings, and that the members be invited to meet at the Grant College on Saturday the 17th inst. at 4 P. M.

Bombay, 10th Jany. 1845.

(Signed). JOSEPH GLEN.

The Proposition made by the Chairman has been concurred in by the Committee.

C. MOREHEAD,
Secretary.

FOR THE YEAR 1846.

COMMITTEE OF MANAGEMENT.

President.

J. GLEN, Esq.

Members.

J. McLENNAN, Esq.

J. BURNES, K. H.

J. DON, M. D.

A. H. LEITH, Esq.

Secretary.

C. MOREHEAD, M. D.

Proceedings of a Quarterly Meeting of the Medical and Physical Society, held at the Grant Medical College on Saturday the 17th January, 1846.

Present.

J. Glen, Esq. President, in the chair.

Members.

J. Don, M. D.; A. H. Leith, Esq.; J. Peet, Esq.; H. Giraud, M. D.; W. K. Forgety, Esq., and C. Morehead, M. D., *Secretary.*

The following Gentlemen were elected ordinary members of the Society.

R. Hussy, Esq.; A. T. Anderson, Esq.; J. W. Reynolds, Esq.; J. E. Freeman, M. D.; R. Bayne, Esq.; F. J. Mosgrove, Esq.; W. C. Brown, Esq.; J. M. Hyslop, M. D.; S. Butler, Esq.; J. T. Steinhauser, Esq.; P. Harris, Esq.; and R. DeC. Peele, Esq., Assistant Surgeons, Bombay Establishment, elected in accordance with Regulation VII.

The voting lists for the election of the Committee of Management were examined and the Gentlemen elected Office-Bearers for the year 1846 were declared as above.

Letters read.

1. A letter from the Medical Board of Bombay, presenting certain books for the use of the Society.

2. A letter from the Medical Board of Bombay, transmitting a Meteorological Register kept at Ootacamund during September last, by Lieut. Ouchterlony, of the Madras Engineers.

3. A letter from F. S. Arnott, M. D., forwarding an extract from the report of Lieut. R. M. Johnstone in charge of the Commissariat Department, on the System of breeding Leeches now successfully and extensively followed at Hyderabad in Sindh.

4. A letter from the Medical Society of Madras, acknowledging the receipt of the 7th number of the Society's Transactions.

5. A letter from the Inspector General of H. M. Hospitals, Calcutta, acknowledging the receipt of the 7th number of the Society's Transactions.

6. A letter from T. B. Johnstone, M. D., notifying his wish to continue a member of the Society.

7. A letter from R. DeC. Peele, Esq. requesting that his name might be added to the list of members of the Society.

8. A letter from G. M. Ogilvie, M. D., requesting to withdraw from the Society.

9. A letter from Messrs. Leckie and Co. dated 10th January 1846, forwarding the statement of the Society's Account for the year 1845.

Communications presented.

1. Report on the Prevailing Diseases at Sukkur during the months of October, November, and December, 1844, by T. Ballantine, Esq., Assistant Surgeon, Indus Fotilla. Presented by the Medical Board of Bombay.

2. Abstract from the Annual Report Submitted to Sir James McGregor, on the sickness at Sukkur and Hyderabad, by J. Burt, Surgeon H. M. 78th Highlanders. Presented by the Medical Board of Bombay.

3. Report on the climate of Sindh, by A. Wright, Esq. 25th Regiment N. I. Presented by the Medical Board of Bombay.

4. Report on the climate of Sindh by J. McKenzie, Esq. 8th, Regiment N. I. Presented by the Medical Board of Bombay.

5. Report on the climate of Sindh by W. J. Ward, Esq. 2d Light Cavalry. Presented by the Medical Board of Bombay.

6. Observations on the System of Invaliding followed in the Bombay Army, by F. S. Arnott, M. D., Surgeon, 18th Regiment N. I. Presented by the Author.

Donations for the Library.

1. Hindustani Version of the London Pharmacopœia, Ed. 1836, by G. G. Spilsbury, Surgeon, and Samachum Dutt, Sub-Assistant Surgeon. Presented by the Medical Board of Bombay.

2. Report on the Medical Topography and Statistics of the Northern Hyderabad and Nagpoor Divisions, the Tenasserim Provinces and the Eastern Settlements, compiled from the records of the Madras Medical Board Office. Published by order of the Madras Government. Presented by the Medical Board of Bombay.

3. Report on Small-Pox in Calcutta, for 1833-34, 1837-38, and 1843-44, and on Vaccination in Bengal from 1827 to 1844, by Duncan Stewart, M. D., Surgeon E. I. Co's Service, Superintendent General of Vaccination, &c. &c. &c. Published by order of Government. Presented by the Medical Board of Bombay.

4. Transactions of the Medical and Physical Society of Calcutta, Vol. IX, Part 1. Presented by that Society.

5. A copy of the Annual Report of the Society of Natural History in the Mauritius for 1845. Presented by that Society.

The next Quarterly Meeting to be held on Saturday the 11th April, 1846.

Proceedings of a Quarterly Meeting of the Medical and Physical Society, held at the Grant Medical College on Saturday the 11th. April, 1846.

Present.

J. Glen, Esq. President, in the chair.

Members.

J. McLennan, Esq.; J. Don, M. D., A. H. Leith, Esq.; J. Peet, Esq.; H. Giraud, M. D., and C. Morehead, M. D., *Secretary*.

The following gentlemen were elected members of the Society.

Corresponding Members.

J. Baron, M. D.; Cheltenham, and J. G. Crosse, M. D.; Norwich.

Ordinary Members.

C. J. F. Imlach, M. D.; G. B. Nuttall, Esq.; J. G. Nicholson, M. D.; J. H. Wilmot, Esq.; R. S. Jackson, Esq.; R. Millar, M. D.; J. S. Sanderson, Esq.; W. Shelding, Esq., and C. G. Wiehe, Esq. Assistant Surgeons, Bombay Establishment, elected in accordance with Regulation VII.

Letters read.

1. A letter from the Medical Board of Bombay presenting certain books for the use of the Society.

2. A letter from J. Green Crosse, M. D., F. R. S., Norwich, presenting certain books for the use of the Society.

Communications presented.

1. The Annual Report of the Civil Hospital, &c. at Ahmedabad for 1845. By S. Sproule, M. D. with three drawings, illustrative of a case in which a large tumour was removed from the neck. Presented by the Medical Board of Bombay.
2. Notes on Small-Pox as observed in the Jamsetjee Jejeebhoy Hospital, in the months of December, January, February, and March last, by C. Morehead, M. D. Presented by the Author.

Donations for the Library.

1. The Bengal Pharmacopœia and General Conspectus of Medicinal Plants, arranged according to the Natural and Therapeutical Systems, edited under the sanction of a Special Committee, by W. B. O'Shaughnessy, M. D., F. R. S. &c. Bengal Medical Service. Presented by the Medical Board of Bombay.
2. Pathologia Indica, or the Anatomy of Indian Diseases, Medical and Surgical, based upon morbid specimens from all parts of India in the Museum of the Calcutta Medical College; illustrated by detailed cases with the prescriptions and treatment employed and comments Physiological, Practical and Historical, by Allen Webb, B. M. S. Professor of Military Surgery in the Calcutta College of Medicine. PART II. Presented by the Medical Board of Bombay.
3. An Essay literary and practical on Inversio Uteri. Part 1st. By J. Green Crosse, M. D., F. R. S., Norwich. Presented by the Author.
4. An Inaugural Address delivered at the opening of the Norfolk and Norwich Hospital Museum, September the 10th 1845; by J. Green Crosse, M. D. F. R. S. Norwich. Presented by the Author.
5. Report of the opening of the Norwich and Norfolk Hospital Museum on the 10th. September 1845, by J. Green Crosse, M. D., F. R. S. Norwich. Presented by the Author.
6. It was resolved to express the thanks of the Society to the Donors of the books presented for the Library, and also to transmit to the Medical Society at Athens a copy of the several Numbers of the Society's Transactions, in return for communications received.

The next Quarterly Meeting to be held on Saturday the 11th July, 1846.

Proceedings of a Quarterly Meeting of the Medical and Physical Society, held at the Grant Medical College on Saturday the 11th July, 1846.

Present.

A. H. Leith, Esq., in the chair.

Members.

W. C. Coles, M. D.; J. Peet, Esq.; H. Giraud, M. D.; and H. J. Carter, Esq. *Officiating Secretary.*

The following gentlemen were elected members of the Society in accordance with Regulation VII.

Assistant Surgeons J. G. Fraser ; R. G. Lord ; W. Davy and C. J. Sylvester, of the Hon'ble Company's Service, Bombay Establishment.

Letters read.

1. Letters from Assistant Surgeons D. Wyllie and H. J. Carter, intimating their wish to continue members of the Society.
2. A letter from G. R. Nuttall, Esq. acknowledging the receipt of a copy of the Regulations.

Communications presented.

1. Three letters from the Medical Board of Bombay ;—the first accompanying a case of Concussion of the Spine in a Seaman named W. Kingsley, by Dr. Shekleton, I. N. of the Hon'ble Company's Steamer Semiramis.—The second, enclosing a General Statistical Return of Patients in the Bombay Lunatic Asylum for 1845, drawn up by Dr. Grierson in charge of the Asylum.—And the third presenting a case of Fracture of the Cranium occurring in a Marine Apprentice, with a drawing of the skull, by Assistant Surgeon W. J. Stuart, I. N., H. C. Brig Taptee.

Donations for the Library.

1. Continuation of a Paper on the treatment of Fractures by splints of a new construction with some remarks on the utility of splints in disease of the Hip-Joint, by W. Keen, Surgeon, Glasgow, reprinted from the Northern Journal of Medicine. Presented by the Author.

2. A paper by H. Giraud, M. D., Professor of Chemistry and Materia Medica in the Grant Medical College, Bombay, on "Simple Processes for the detection of the poisonous compounds of Arsenic, Mercury, and Antimony."

The next Quarterly Meeting to be held on the 3rd October, 1846.

Proceedings of a Quarterly Meeting of the Medical and Physical Society, held at the Grant Medical College on Saturday the 3rd October, 1846.

Present.

J. Glen, Esq., President, in the chair.

Members.

C. Morehead, M. D.; A. H. Leith, Esq; H. Giraud, M. D.; W. C. Coles, M. D., and H. J. Carter, Esq. *Officiating Secretary.*

The following Gentlemen were elected members of the Society in accordance with Regulation VII.

Assistant Surgeons J. M. Knapp; T. Murray; J. McAlister; H. P. Lawrence; C. C. Mead; M. Cruickshank, and A. R. Fraser, of the Hon'ble Company's Service, Bombay Establishment.

Letters read.

1. Letters from F. Broughton, Esq. and W. Stuart, Esq. requesting that their names might be withdrawn from the list of members of the Society.

2. A letter from Dr. Bolton, Principal Medical Officer at Port Louis, Mauritius, thanking the Society for the 7th number of its "Transactions," presented to the Medical Staff Library at Port Louis.

3. A letter from Dr. Morehead containing an extract from a private letter from Dr. Baron, transmitting the most cordial and respectful thanks of the latter for the honor conferred on him by the Society in electing him a Corresponding Member.

4. A letter from Dr. Giraud, requesting that he might be allowed to withdraw his paper on "Simple Processes for the detection of the poisonous compounds of Arsenic, Mercury, and Antimony," Dr. Giraud's request had been considered by the Committee and the paper returned.

Communications presented.

1. "On the Prevalence of Intermittent Fever among the Troops assembled at Hyderabad in Sindh during the Autumn of 1843." By Assistant Surgeon H. J. Carter. Presented by the Author.

The next Quarterly Meeting of the Society to be held on Saturday the 3rd January 1847.



LIST OF MEMBERS

OF THE

MEDICAL AND PHYSICAL SOCIETY BOMBAY.

ORDINARY MEMBERS BOMBAY PRESIDENCY.

The asterisk (*) marks those members who are absent on furlough or sick leave.

Anderson, A. T. Esq., *Assistant Surgeon.*
 Arbuckle, W., M. D., *Assistant Surgeon.*
 Arnott, F. S., M. D., *Surgeon.*

Babington, W. F. Esq., *Assistant Surgeon.*
 Ballantine, T. Esq., *Assistant Surgeon.*
 Barrington, W. F., LL.D., *Surgeon.*
 Behan, R. J. Esq., *Surgeon.*
 Bean, J. Esq., *Assistant Surgeon.*
 Black, C., M. D., *Assistant Surgeon.*
 Boycott, T. Esq., *Assistant Surgeon.*
 Boyd, J. Esq., *Surgeon.*
 Bayne, R. Esq., *Assistant Surgeon.*
 Boyrenson, T. A., M. D., *Assistant Surgeon.*
 Brown, W. C. Esq., *Assistant Surgeon.*
 Burnes, J., K. H., *Superintending Surgeon.*
 Butler, T. S. Esq., *Assistant Surgeon.*

Calder, A. T., M. D., *Assistant Surgeon.*
 Campbell, W., M. D., *Assistant Surgeon.*
 Carnegie, D. A., M. D., *Assistant Surgeon.*
 Carter, H. J. Esq., *Assistant Surgeon.*
 Coles, W. C., M. D., *Assistant Surgeon.*
 Craig, J. Esq., *Assistant Surgeon.*
 Crespigny, E. de. Esq., *Assistant Surgeon.*
 * Cruickshank, P. Esq., *Assistant Surgeon.*
 Cruickshank, A. C. Esq., *Assistant Surgeon.*

Daubeny, J. Esq., *Assistant Surgeon.*
 Davidson, R. H., M. D., *Assistant Surgeon.*
 Davey, W. Esq., *Assistant Surgeon.*
 Doig, J. Esq., *Assistant Surgeon.*
 Don, J., M. D., *Surgeon.*

Fogerty, W. K. Esq., *Surgeon in Bombay.*
 Fraser, J. Esq., *Surgeon.*
 Fraser, J. G., M. D., *Assistant Surgeon.*
 Fraser, A. R. Esq., *Assistant Surgeon.*
 Freeman, J. E., M. D., *Assistant Surgeon.*

* Gibb, H., Esq., *Surgeon.*
 Gibson, A. Esq., *Surgeon.*

* Gillanders, W. P. Esq., *Assistant Surgeon.*
 Glen, J. Esq., *Inspector General of Hospitals.*
 Gray, P. Esq., *Surgeon.*

Grierson, D., M. D., *Surgeon.*

* Hamilton, J. J. Esq., *Surgeon.*
 Hathorn, H. P. Esq., *Surgeon.*
 Hyslop, J. M., M. D., *Assistant Surgeon.*
 Hussey, R. Esq., *Assistant Surgeon.*

Imlach, C. J. F., M. D., *Assistant Surgeon.*
 Impey, E. Esq., *Assistant Surgeon.*

Jackson, R. S. Esq., *Assistant Surgeon.*
 Johnstone, T. P., M. D., *Assistant Surgeon.*

Keith, J. Esq., *Assistant Surgeon.*
 Keith, J., M. D., *Assistant Surgeon.*

* Kirk, R. Esq., *Surgeon.*

Knapp, J. M. Esq., *Assistant Surgeon.*

Lawes, V. Esq., *Assistant Surgeon.*
 Lawrence, H. P. Esq., *Assistant Surgeon.*
 Leith, A. H. Esq., *Surgeon.*
 Lord, R. G., M., D., *Assistant Surgeon.*

Mahaffy, E., M. D., *Assistant Surgeon.*
 McAlister, J. Esq., *Assistant Surgeon.*

McKenzie, T. Esq., *Surgeon.*

* McKenzie, J. Esq., *Assistant Surgeon.*
 McKenzie, G. J. Esq., *Assistant Surgeon.*
 McLennan, J. Esq., *Superintending Surgeon.*
 Mead, C. C. Esq., *Assistant Surgeon.*

Miller, J. R., M. D., *Assistant Surgeon.*
 Millar, R., M. D., *Assistant Surgeon.*
 Morehead, C., M. D., *Surgeon.*

Murray, J. Esq., *Surgeon.*
 Murray, W. R. Esq., *Assistant Surgeon.*
 Murray, T. Esq., *Assistant Surgeon.*
 Mosgrove, F. J. M. Esq., *Assistant Surgeon.*

* Neilson, W., M. D., *Assistant Surgeon.*
 Nicholson, B. A. R. Esq., *Surgeon.*
 Nicholson, R. M. D., *Assistant Surgeon.*
 Nicholson, J. G. Esq., *Assistant Surgeon.*
 Nuttall, G. B. Esq., *Assistant Surgeon.*

* Osborn, S., M. D., *Assistant Surgeon.*
 Patch, J. Esq., *Superintending Surgeon.*
 Peart, J. H. Esq., *Surgeon.*
 Peach, W. Esq., *Assistant Surgeon.*
 Peele, R. de C. Esq., *Assistant Surgeon.*
 Peet, J. Esq., *Assistant Surgeon.*
 Pigou, W. H. Esq., *Assistant Surgeon.*
 Pitman, H. Esq., *Assistant Surgeon.*
 Pirie, J., M. D., *Assistant Surgeon.*
 Reynolds, J. W. Esq., *Assistant Surgeon.*
 Ritchie, D., M. D., *Surgeon.*
 Rooke, B. P. Esq., *Surgeon.*
 Ross, J. Esq., *Surgeon.*
 Sanderson, J. T. Esq., *Assistant Surgeon.*
 Shekleton, J. F., M. D., *Assistant Surgeon.*
 Skelding, W. Esq., *Assistant Surgeon.*
 Smith, J. Y., M. D., *Assistant Surgeon.*
 Sproule, S., M. D., *Assistant Surgeon.*
 Stewart, J., M. D., *Surgeon.*

Steinhauser, J. T. Esq., *Assistant Surgeon.*
 Stocks, J. C. Esq., *Assistant Surgeon.*
 Stone, E. W. Esq., *Assistant Surgeon, H. M. S.*
 Style, M., Esq., *Assistant Surgeon.*
 Sylvester, C. J., M. D., *Assistant Surgeon.*
 Tawse, A. Esq., *Superintending Surgeon.*
 Taylor, W. B. Esq., *Surgeon.*
 Thom, W. Esq., *Assistant Surgeon.*
 Thompson, M. Esq., *Assistant Surgeon.*
 Thomson, A. S. Esq., *Assistant Surgeon, H. M. S.*
 Turner, J. Esq., *Assistant Surgeon.*
 Vaughan, J. Esq., *Assistant Surgeon.*
 Walker, A., M. D., *Assistant Surgeon.*
 Waller, T. Esq., *Assistant Surgeon.*
 Ward, T. T. Esq., *Assistant Surgeon.*
 Wiche, C. G., M. D., *Assistant Surgeon.*
 Wight, R. Esq., *Superintending Surgeon.*
 Woosnam, R. Esq., *Assistant Surgeon.*
 Wright, A. Esq., *Assistant Surgeon.*
 Wyllie, D., M. D., *Assistant Surgeon.*
 Wilmot, J. H., Esq., *Assistant Surgeon.*
 Young, E. J. Esq., *Assistant Surgeon.*

W. B. O'Shaughnessy, Esq., *Deputy Assay Master, Calcutta.*
 P. Jackson, Esq., *Bengal Establishment.*

J. Shaw Esq., *Assistant Surgeon Madras Establishment.*
 A. Anderson. Esq., *Acting Surgeon to H. B. Majesty's Superintendent in China.*

CORRESPONDING MEMBERS.

J. S. Law, Esq. B. C. S.
 Captain Shortrede, *Superintendent of the Trigonometrical survey.*
 Dr. Pruner, *Chief Physician to the Military Hospital and Professor in the Medical College at Cairo.*
 M. M. J. Desjardin, Esq., *secretary to the society of Natural History in Mauritius.*

Sir George Ballingall, *Professor of Military surgery, Edinburgh.*
 Dr. Laidlaw, *Alexandria.*
 R. H. A. Hunter, Esq., *staff Surgeon H. B. Majesty's Service.*
 J. G. Crosse, M. D. *Nerwich.*
 J. Baron, M. D., *Cheltenham.*



